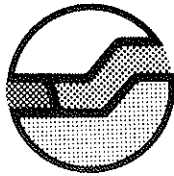

ANNUAL REPORT



Department of Conservation
and Land Management

1 JULY 1989 TO 30 JUNE 1990

ANNUAL REPORT



Department of Conservation
and Land Management


1 JULY 1989 TO 30 JUNE 1990

HON MINISTER FOR THE ENVIRONMENT

In accordance with Section 62 of the Financial Administration and Audit Act 1985, I submit for your information and presentation to Parliament the Annual Reports of the Department of Conservation and Land Management and the Roadside Conservation Committee, for the year ending 30 June 1990.

Included in this report are performance indicators by which the effectiveness and efficiency of some departmental operations can be measured. These are as prescribed in the Financial Administration and Audit Act.

This Report also contains general statistics, tables and appendices which convey the Department's performance for the year and provide a comparison against previous years.



Syd Shea
EXECUTIVE DIRECTOR

This document contains the annual reports of the:

- . Department of Conservation and Land Management
- . Roadside Conservation Committee

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EXECUTIVE DIRECTOR'S REVIEW

The 1989/90 year unfortunately was concluded by a period during which the Department was subjected to a campaign aimed at discrediting it and the forest industries. The Minister and the Department had no option but to devote considerable resources to rebutting the allegations in a comprehensive way. I believe we were successful in convincing most members of the community of the true story about CALM's achievements in forest management. If the aims of the campaign were to cause divisions in the Department, it failed miserably. I am pleased to record that there was overwhelming staff support for CALM and appreciation of the strong defence that the Minister for the Environment articulated. The Department is even more united and committed to the task of managing lands, waters and wildlife in its trust on behalf of the people of Western Australia.

It is ironic that the attempts to discredit the Department centred on the fact that it manages both the production and conservation values of the State's forest: One of the catchcries of the ecologically sustainable development debate is the need to "integrate economic and environmental goals." CALM's approach to forest management is a practical example of this philosophy.

One of the principal goals that the Department set when it was formed was to remove the conflict over forest management and to assist the forest industries to undergo a major restructure. In the five years since its formation, the return to the community from timber sales in the forest has increased dramatically, the royalty system has been restructured to provide incentives for greater utilisation and value adding, new technologies have been developed to improve utilisation and the value of forest products, large areas of the forest have been permanently secured in national parks and nature reserves and the timber industry, for the first time in its history, has been provided with a secure resource. As a consequence of these initiatives, Western Australia's forest management has been held up as a model for the rest of Australia.

One of the unfortunate byproducts of the controversy over forest issues has been the overshadowing of the major achievements and initiatives of CALM staff throughout the State. I am extremely proud of the major expansion of our volunteer program, our publications such as that on rare and endangered species, the success of the captive breeding program, the development of major management plans for areas such as the Dampier Archipelago and Ningaloo Marine Park, the Department's commitment to work with Aboriginal people, the unique desert burning program, the success of the long-term research program on the impact of foxes on native fauna and the major upgrading of recreation facilities throughout the State.

In addition to increasing the value of the forest products that are derived from State forest, the Department is the principal architect of a major tree planting program on cleared agricultural land. This program, in addition to providing a new resource base for forest industries, will make a major contribution to reducing the environmental problems of south-west Western Australia by reducing salination and fertiliser pollution of estuaries.

I am pleased to acknowledge that the farming community of the State is leading the drive to establish more trees on farms and is strongly supportive of the Department's tree planting initiatives. A feature of this new approach to tree planting is the Department's commitment to work with farmers to integrate trees into farms in a way which will result in increased agricultural productivity (by providing shelter for animals and crops) reduced erosion, salination and water logging, while at the same time provide a new cash crop for farmers.

The Department has continued to increase its revenue. At the time of formation, CALM's revenue only accounted for 45 per cent of its operating expenditure. In the 1989/90 financial year, CALM's revenue accounted for 72 per cent of its operating expenditure. This has meant that the Department has been able to dramatically increase the provision of services to the community at a reduced cost to the taxpayer.

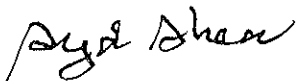
There continues to be an exponential increase in public interest in environmental issues which inevitably is translated in increased demand for services from the Department. Given the need to constrain public expenditure, the only way that it will be possible to meet this demand is by continuing to increase the efficiency of the Department and its revenue base.

Throughout the Department, I am delighted to see the commitment to conservation and land management and in particular the synergisms that have developed between people with vastly different skills and expertise. I am sure this is the major factor responsible for the Department's success in meeting the increasing demands of the public for access to the State's natural areas, while at the same time providing greater environmental protection.

Each succeeding year from the time of CALM's formation, various members of the Corporate Executive, including myself, have foreshadowed a year of consolidation. This has never happened. Each year has brought new challenges and new initiatives, and most of all we have had to accept the fact that the need to change is the only constant factor.

I would like to think that the coming year will be one in which we can consolidate, but I believe that once again we will have many new challenges. I am conscious of the fact that the workload on staff has been excessive. I believe, however, that the community does appreciate what has been achieved. I certainly could not ask for a more loyal and committed group of people to work with.

I certify that the performance indicators used throughout this report are based on proper records and fairly represent the performance of the Department of Conservation and Land Management for the year ended 30 June 1990.

A handwritten signature in cursive script that reads "Syd Shea".

Syd Shea
EXECUTIVE DIRECTOR

GENERAL INFORMATION

The Department of Conservation and Land Management and three statutory controlling bodies were established under the Conservation and Land Management Act 1984. The controlling bodies are the Lands and Forest Commission, the National Parks and Nature Conservation Authority and the Forest Production Council. All are responsible to the Minister for Conservation and Land Management.

Functions under the Legislation

The Conservation and Land Management Act specifies a series of functions for the three controlling bodies¹ and the Department.

In brief the functions of the Lands and Forest Commission, in which State forests and timber reserves are vested, are:-

- . consider changes to the purpose, boundary and area of vested lands;
- . develop policies to achieve or promote the multiple use and sustained yield of the indigenous forest resource for the satisfaction of long term social and economic needs, and for exotic species, the optimum yield in production;
- . process and monitor land management plans for vested areas;
- . advise the Minister for Conservation and Land Management when requested;
- . provide advice to the public on matters related to vested lands;
- . instigate policy research.

The functions of the National Parks and Nature Conservation Authority, in which national parks, nature reserves, marine reserves and other lands are vested, are:-

- . consider changes to the purpose, boundary and area of vested lands;
- . develop policies for the preservation and enjoyment of the natural environment and the promotion of appreciation of flora and fauna, consistent with the essential purposes of vested lands;
- . process and monitor land management plans for vested lands;
- . advise the Minister on the development of policies for the conservation and management of flora and fauna when requested;
- . provide advice to the public on matters related to vested lands;
- . instigate appropriate research.

The Forest Production Council's functions are to advise the Minister on:-

- . matters relevant to production from State forests and timber reserves;
- . improvement in production consistent with maintenance of other forest values;

¹While the functions of the three controlling bodies are reported here, their activities and achievements for 1989/90 are described in a separate report.



- . improvement in use, processing and marketing of forest produce;
- . research to achieve multiple use and sustained yield of the forest resource;
- . contents of proposed management plans.

The functions of the Department of Conservation and Land Management are:-

- . manage State forests, national parks, nature reserves and other lands and the associated forest produce, fauna and flora;
- . assist the Commission, Authority and Council in their functions;
- . encourage the development of forest production requirements;
- . conserve and protect flora and fauna, and administer the Wildlife Conservation Act;
- . carry out research into land management, and conservation and protection of flora and fauna;
- . advise and cooperate with others in the public interest;
- . advise the Minister on land matters.

The Conservation and Land Management Amendment Act No. 76 of 1988 included powers relating to marine reserves, tree plantations and timber sharefarming agreements.

In its nature conservation functions the Department administers the Wildlife Conservation Act 1950 and associated regulations. This Act applies to any indigenous or migratory fauna and any flora native to the State, whether found on Crown land, private land or territorial waters of the Commonwealth. Its essential purpose is the conservation of flora and fauna in the State.

Although the Forests Act 1918 and the National Parks Authority Act 1976 were repealed to make way for the Conservation and Land Management Act 1984, the Forests regulations and the National Parks regulations remain in force until replaced by new regulations.

Associated with the passage of the Conservation and Land Management Act in 1984 were appropriate amendments to the Wildlife Conservation Act 1950, the Land Act 1933, the Bush Fires Act 1954, the Agriculture and Related Resources Protection Act 1976, the Fisheries Act 1905, and the Public Works Act 1902.

The Department also administers the following Acts:

Timber Industry Regulation Act 1926, which empowers it to record, investigate and secure safe working practices in the bush and mill operations of the timber industry.

Sandalwood Act 1929, which gives control over sandalwood gathering via a fixed quota, licensing and limiting collection of sandalwood on private property.

East Perth Cemeteries Act 1932, for management and control of the disused cemeteries which are now an historical precinct.

Other Legislation

The Minister for Conservation and Land Management has a specific role under Section 24 of the Mining Act 1978. Applications for mining tenements on any national parks, A Class nature reserves, State forest, CALM Act timber reserves and any A Class reserves managed by the Department within the South-West Land Division and the Shires of Esperance and Ravensthorpe must be referred by the Minister for Mines for concurrence by the Minister for CALM. Applications for mining tenements on any other reserves managed by the Department must be referred by the Minister for Mines for the recommendation of the Minister for CALM.

The Department is involved in drawing up conditions for mining activity.

Other Acts under which the Department has specific responsibilities are:

- Alumina Refinery Agreement Act 1961
- Alumina Refinery (Pinjarra) Agreement Act 1969
- Alumina refinery (Wagerup) Agreement and Acts Amendment Act 1978
- Alumina Refinery (Worsley) Agreement Act Amendment Act 1978
- Bush Fires Act 1954
- Collie Coal (Griffin) Agreement Act 1979
- Collie Coal (Western Collieries) Agreement Act 1979
- Fisheries Act 1905
- Silicon (Picton) Agreement Act 1987
- Wesply (Dardanup) Agreement Authorisation Act 1975
- Wood Chipping Industry Agreement Act 1969

Other acts which affect the Department's land management responsibilities are:

- Aboriginal Heritage Act 1972
- Aerial Spraying Control Act 1966
- Agriculture and Related Resources Protection Act 1976
- Agriculture Protection Board Act 1950
- Control of Vehicles (Off Road Areas) Act 1978
- Country Areas Water Supply Act 1947
- Environmental Protection Act 1986
- Land Act 1933
- Local Government Act 1960
- Main Roads Act 1930
- Metropolitan Water Supply Sewerage and Drainage Act 1909
- Mineral Sands (Western Titanium) Agreement Act 1975
- Petroleum Act 1967
- Petroleum Pipelines Act 1969
- Rights in Water and Irrigation Act 1914
- Soil and Land Conservation Act 1945
- State Energy Commission Act 1979
- Swan River Trust Act 1988
- Town Planning and Development Act 1929

Commonwealth Acts relevant to the Department's activities:

- Arts, Territories and Environment Legislation Amendment Act 1982
- Australian Heritage Commission Act 1975
- Conservation Legislation Amendment Act 1988
- National Parks & Wildlife Conservation Act 1975
- Whale Protection Act 1980
- Wildlife Protection (Regulation of Exports and Imports) Act 1982
- World Heritage Properties Conservation Act 1983

International Agreements relevant to the Department's activities:

Agreement between the Government of the People's Republic of China and the Government of Australia for the Protection of Migratory Birds and their Environment.

Agreement between the Government of Japan and the Government of Australia for the Protection of Migratory Birds and Birds in Danger of Extinction and their Environment.

Convention on Wetlands of International Importance Especially as Waterfowl Habitat.

Convention on International Trade in Endangered Species of Wild Fauna and Flora.

Convention for the Protection of the World Cultural and Natural Heritage.

Ministerial Responsibility

The Department is responsible to the Minister for the Environment.

CALM's Mission

Western Australia has a beautiful and diverse natural environment which provides material, aesthetic and spiritual benefits. The natural environment is an essential component of the quality of life for West Australians. The statement of mission adopted for the Department of Conservation and Land Management is therefore:-

*TO CONSERVE WESTERN AUSTRALIA'S WILDLIFE AND MANAGE LANDS AND WATERS
ENTRUSTED TO THE DEPARTMENT FOR THE BENEFIT OF PRESENT AND FUTURE
GENERATIONS.*

Primary objectives are:

Management

To protect, restore and enhance the value of resources entrusted to the Department so as to meet, as far as possible, the diverse expectations of the community.

Conservation

To conserve the indigenous plant and animal species and environmental processes in natural habitats throughout the State.

Production

To provide and regulate the supply of those renewable resources that Government decides should be used, on a sustained yield basis for the satisfaction of long-term social and economic needs, and in a manner that minimises impact on other values.

Recreation

To facilitate the public enjoyment of the natural attributes of public lands and reserved waters in a manner that does not compromise conservation and other management objectives.

Knowledge

To seek a better understanding of the natural environment and to promote awareness and appreciation of its values.

To achieve the primary objectives the Department will:

Provide an effective administrative framework for the conservation of wildlife throughout the State and the management of lands, waters and natural resources entrusted to the Department.

This will involve:

- . The maintenance of a corporate executive to establish, review and refine departmental aims, policies and priorities; to monitor the implementation of management plans and to see that goals are achieved.
- . The maintenance of operations staff to implement policies and management plans and to set up efficient financial, administrative and management systems.
- . The provision of a Research Division to provide the scientific basis for conservation and land management, and provide scientific and environmental monitoring and advice to managers.
- . The establishment of a system of regional and district management, where staff convert plans and policies into work programs, carry out the work, provide feedback on progress and policy and planning needs, and maintain close, constructive relationships with local communities.
- . The maintenance of supporting or service branches to prepare management plans, to set standards and to assist with the implementation of research findings, new technology, and improved methods of conservation and land management.
- . the development and maintenance of corporate information systems to facilitate the sharing of data, efficient communication and decision making.
- . The recruitment and maintenance of a well motivated and competent staff.
- . The provision of programs for staff, health, safety development and training.
- . Ensuring liaison, cooperation and coordination with other agencies or people with a function or interest in conservation and land management.
- . The maintenance of national and international liaison and cooperation in the field of nature conservation and the management of renewable natural resources.

Establish and maintain a system of secure reserves which protect viable representative samples of all the State's natural ecosystems and species, both terrestrial and aquatic, as well as areas suitable for recreation and the production of renewable natural resources.

This will involve:

- . The development and maintenance, in conjunction with other government instrumentalities and the public, of a comprehensive data base on the occurrence and conservation status of the State's ecosystems and species.
- . The maintenance of a representative committee to evaluate existing nature conservation reserves and to recommend additions, deletions or exchanges.

- . Categorising lands and waters entrusted to the Department into priority use zones and applying the principle of multiple use to provide for the needs of nature conservation, recreation and production.
- . Protecting ecosystems, landscape and the cultural heritage on lands and waters entrusted to the Department from damage by fire, disease, chemicals, grazing, feral animals and people.
- . Developing prescriptions for control of disturbance and for rehabilitation of damaged forests, parks and reserves.
- . Opposing the incompatible use of lands and waters entrusted to the Department and opposing the release of such lands and waters for other purposes.

Ensure that conservation and land management is carried out according to sound, well-researched scientific principles.

This will involve:

- . Carrying out, encouraging, supporting and publishing scientific, economic and social research relevant to the Department's needs.
- . Establishing long-term monitoring of ecosystems and individual species, and of recreation requirements and effects.
- . Developing and maintaining inventories of biological resources on lands and waters entrusted to the Department, and where appropriate, Statewide.
- . Liaising with other research and land management organisations to define, prioritise and coordinate research programs and publishing results.
- . Ensuring the efficient transmission of research findings into operational practice.

Provide public education and information programs designed to increase community understanding of and support for nature conservation and natural land management.

This will involve:

- . The establishment of interpretation centres with appropriate facilities for education and activity programs.
- . The dissemination of relevant information.
- . The promotion of direct interaction between staff and the public.
- . The encouragement and facilitation of publicity for nature conservation and natural resource management.
- . The establishment and maintenance of demonstration areas (eg. arboreta and trial plots) to demonstrate the performance of trees and other plants to rural communities.
- . The promotion and facilitation of the use of native trees and plants to combat land degradation, create wildlife habitat, conserve water resources and enhance the human environment.

Encourage and assist the public to participate in the development of conservation and land management policies and the implementation of management and research programs.

This will involve:

- . The use of formal processes which involve the:
 - Lands and Forest Commission;
 - National Parks and Nature Conservation Authority;
 - Forest Production Council; and
 - public submissions to the planning process, as described in the Conservation and Land Management Act, 1984.
- . The establishment of consultative and advisory committees, when appropriate, to facilitate an exchange of information between organisations and public groups and to provide advice to the Executive Director.
- . The formation of 'friends' groups and similar associations and the organisation of voluntary assistance programs.
- . The training of staff in the objectives and techniques of public participation.

Prepare and implement management plans for lands and waters entrusted to the Department.

This will involve:

- . The establishment of priorities for management plan preparation according to set criteria.
- . Restricting procedures to necessary operations to maintain public safety and the status quo of area management where no management plan exists.

Prepare and implement wildlife management programs for wildlife throughout the State.

This will involve:

- . Providing special protection for declared rare (endangered) flora by regulating use of their habitat.
- . Managing endangered animal populations to ensure their survival.

Prepare and implement strategies to promote and encourage development of the forest production requirements of the State.

This will involve:

- . Continuous review of supply and demand data for forest products.
- . The development of cost effective procedures for growing, processing and marketing timber at the level sustainable under sound forest management.
- . Establishment of pine forests to supplement available hardwood supplies when necessary.
- . Intensive management of the highest quality hardwood forest to maximise timber production.

Re-forestation of cleared lands with hardwood forests to supplement production from native forests and to assist in soil and water conservation.

Manage approved commercial operations on renewable natural resources according to the following principles:

- resources are managed to ensure their long-term conservation;
- a fair and equitable return is received by the State for the resource;
- wherever possible the operation is commercial viable;
- the resource is managed to minimise waste.

Prepare and implement strategies to promote and encourage recreational use of lands and waters entrusted to the Department in ways which:

- are consistent with the purpose of the area;
- produce a return to the Department for services and amenities provided;
- provide an equitable allocation of land and resources where there is competition between user groups;
- allow for commercial operators to provide services where appropriate.

Using expertise in conservation, land management and associated training, provide skills and services to other organisations and groups.

Administrative Structure

The Department is headed by an Executive Director who is appointed for a five-year term. Besides being the permanent head the Executive Director is a member of the Lands and Forest Commission, an ex-officio member of the National Parks and Nature Conservation Authority and Chairman of the Forest Production Council.

The management philosophy adopted by the Department is one of devolution of authority and recognition, development and utilisation of the skills of staff. Given requisite ability there should be no impediment to the progress of an individual in the organisation.

The Department operates a successful corporate executive. The diverse nature of functions makes this approach essential. It comprises the Executive Director, General Manager, seven Directors and a Manager. Regional, branch and other specialist officers are involved according to the relevance of matters discussed.

CALM is extensively regionalised in a way which provides the benefits of small autonomous organisations in close proximity to their area of operations while providing access to services that are best provided by a larger integrated organisation. Regions are responsible for the management of all departmental lands and waters and for conservation of flora and fauna within their boundaries. According to the intensity of activity regions are subdivided into districts.

Accordingly, the Department is spread over many locations. In the country there are 10 regional, 21 district and 4 sub. district offices. Figure 1 shows CALM regional boundaries and the location of regional and district offices. Within the regions National Park Rangers are at 29 other locations, a District Wildlife Officer at one other.

In the Metropolitan Area, the Corporate Executive and the Economics and Public Affairs branches are at Crawley. Other supporting and specialist branches are located at Como. There are also 3 branches at Canning Bridge with the Metropolitan Region.

A number of research programs are conducted throughout the State with every region attracting some research effort.

The detailed structure of divisions, branches and regions as at 30 June 1990 is shown in Figure 2. The names and qualifications of the officers occupying managerial positions are shown in the table following.

Responsibilities of Branches and Regions

The essential tasks for branches and regions are as follows:

Economics Branch - advises the Executive Director on economics, socio-economics and long-term strategic management planning across all functions and activities of the Department. The work directly influences the magnitude of the Department's revenues and expenditures, and the management of forests and other resources.

Public Affairs Branch - produces publications, displays, media releases and audio-visuals.

Internal Audit - responds directly to the General Manager, providing regular management oriented appraisals of operations and activities within the Department.

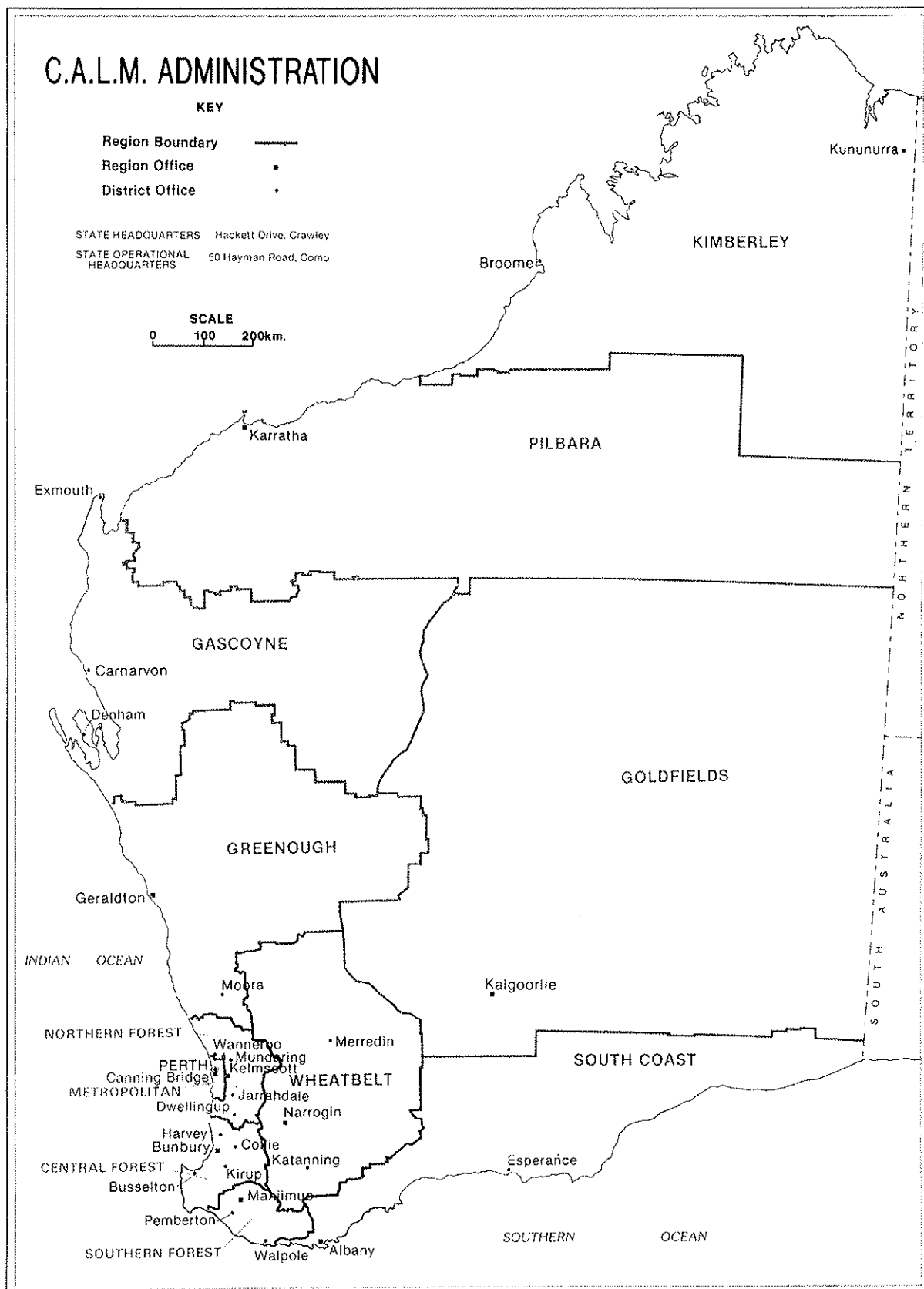


Figure 1

Wildlife Branch - provides information and advice on wildlife protection and management, protects native flora and fauna throughout the State, administers wildlife licences and permits, enforces regulations as necessary, maintains and manages data-bases on wildlife resources and conservation status.

Environmental Protection Branch - prepares guidelines and procedures for protection from dieback, weeds and vermin, evaluates mining proposals, and advises on implementation and rehabilitation of CALM land.

Planning Branch - prepares management plans in draft and final form according to requirements of the Act and provides planning advice.

Recreation, Landscape and Community Education Branch - provides landscape planning and design assistance, recreation planning research and management advice, coordinates interpretation and community education programs.

Policy and Extension Branch - provides policies and strategies for recreation, tourism and other visitor services and for Aboriginal and special interests on CALM lands and waters. Coordinates CALM Volunteers, conducts market research.

Timber Production Branch - controls and monitors the harvesting of timber and collection of royalties; advises on timber quality, wood technology and related matters.

Inventory Branch - services management operations of the Department with resource information and plans for forest production, disease protection; develops computer systems.

Silviculture Branch - develops silvicultural guidelines and practices, advises on their implementation and manages nurseries and seed supplies.

Fire Protection Branch - prepares fire protection and suppression plans, provides detection and aerial prescribed burning services, and conducts fire training courses.

Research - there are 12 scientific research programs designed to provide specialised information which will support conservation of flora and fauna, land and resource management planning in discrete areas of the CALM estate. In particular, issue plans and wildlife management programs are based on research findings which are related to operational practice.

Land Information Branch - provides and maintains a geographical information service relating to CALM's land and management responsibilities.

Computing Services Branch - provides and maintains a computing facility with networking to the majority of CALM locations together with IT advice and support to departmental users.

Library - provides scientific literature information and allied services to CALM staff and other agencies.

Records Branch - provides a records management service.

Human Resources Branch - provides human resource management through coordination of selection and training of staff, liaison with unions and industrial associations, conducting a safety, health and welfare program, and maintaining staff records.

Finance Branch - maintains, operates and develops financial systems and procedures and provides users with financial training, expertise, reports and budgeting information.

Engineering Branch - administers the vehicle fleet, houses and buildings, and stores, and consults on the engineering of various projects.

Land Administration Branch - administers land and marine tenure and transactions, using applications, leases, permits and offences within the CALM estate.

Department of Conservation and Land Management

Organisational Structure as at 30 June 1990

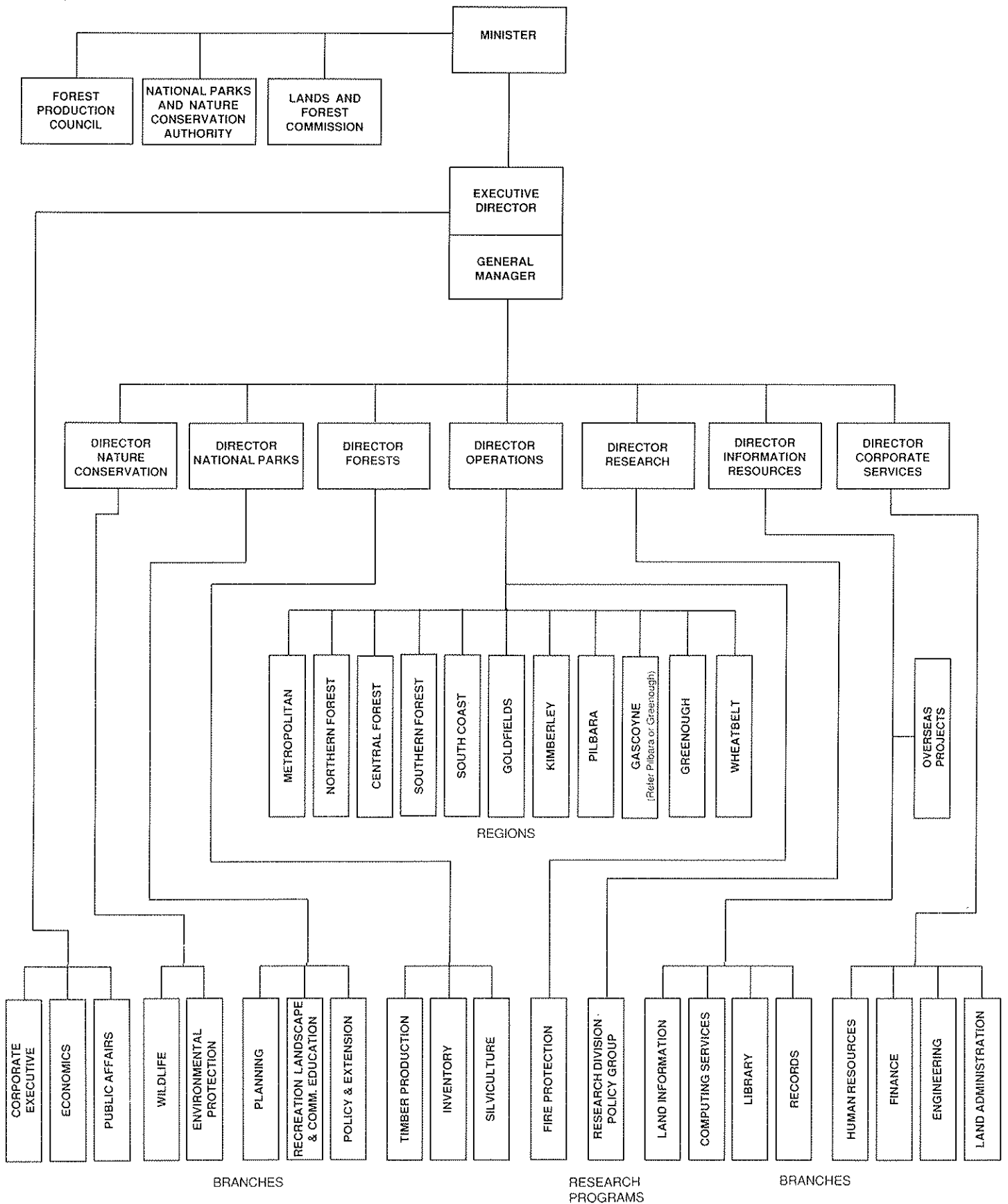


Figure 2

SENIOR DEPARTMENTAL OFFICERS

Executive Director	S R Shea Ph D, MSc, BSc
General Manager	R J Underwood M For, BSc, Dip For
Director Nature Conservation	B R Wilson Ph D, BSc, FTS
Director National Parks	C D Haynes BSc For
Director Forests	D J Keene BSc For
Director Operations	C J Edwards BSc For
Director Research	A A Burbidge Ph D, BSc Hons
Director Information Resources	F H McKinnell Ph D, Dip For
Director Corporate Services	A G Errington AIT Pub Admin
Director Economics	G Malajczuk Ph D, MSc, Bsc
Regional Manager, Metropolitan	D A Haswell MSc, BSc For
Regional Manager, Northern Forest	E A Jenkins BSc For, Dip For
Regional Manager, Central Forest	D Spriggins BSc For
Regional Manager, Southern Forest	A W Walker BSc For Hons
Regional Manager, South Coast	J R Watson Ph D, BSc, ARIC
Regional Manager, Goldfields	I G Kealley BSc For
Regional Manager, Kimberley	C C Done BSc For
Regional Manager, Pilbara/Gascoyne	H W Chevis BSc For
Regional Manager, Greenough/Gascoyne	G W Mercer B App Sci, Grad Dip (Env Studies) Dip T
Regional Manager, Wheatbelt	K J Wallace BSc Hons, Dip Ed
Manager, Corporate Executive	D B Johnston M App Sci, Dip Cart
Manager, Public Affairs Branch	R A Kawalilak BA
Manager, Wildlife Branch	Vacant
Manager, Environmental Protection Branch	F E Batini MSc, BSc For
Chief Wildlife Officer	D J Mell AATA
Manager, Planning Branch	A J Williamson M For, MSc, BSc
Manager, Recreation, Landscape & Community Education Branch	W G Schmidt M For, BSc
Manager, Policy and Extension Branch	Vacant
Manager, Timber Production Branch	J H Murch BSc For Hons
Manager, Inventory Branch	H Campbell BSc For
Manager, Silviculture Branch	F J Bradshaw BSc For
Manager, Fire Protection Branch	J K Smart BSc For
Principal Operations Officer	P C Kimber BSc For Hons
Curator, WA Herbarium	J A Armstrong BSc Agric Hons
Senior Principal Research Scientist	P E Christensen Ph D, BSc Hons
Senior Principal Research Scientist	S D Hopper Ph D, BSc Hons
Manager, Land Information Branch	P J Bowen Grad Dip S&M, Dip Cart
Manager, Computing Services Branch	T J Morgan MSc, BSc Hons, Dip Comp
Librarian	H F Clift MA Hons
Manager, Human Resources Branch	R G Cooper BA
Manager, Finance Branch	J C Byrne Ph D, MBA, CPA
Manager, Engineering Services Branch	I R Darragh AIT Mech Eng

Regions

The general responsibilities allocated to regions are to:

- prepare financial estimates and manage approved budgets;
- participate in project teams preparing land and marine area management plans;
- prepare and supervise work programs (based on approved management plans programs or necessary operations) for staff, employees and contractors;
- help, guide and train departmental staff in the region and promote the health and safety of the departmental personnel;
- ensure the conservation of indigenous flora and fauna;
- supervise and regulate industry (e.g. wildflower pickers, apiarists, timber and mining operations) on departmental lands;
- preserve or restore the natural environment on departmental land;
- provide information and advice on land management and conservation to people in the region; promote conservation and good land and marine area management;
- provide a focal point for interaction between research and operations; and
- liaise with State government and local government agencies in the region; represent the Department on interdisciplinary working groups, and advisory committees.

Program Management

Commencing in the financial year 1990/91 CALM's management will be according to approved Management Programs. These are:-

<u>PROGRAM</u>	<u>SUB-PROGRAMS</u>
Wildlife Management	Planning and Research Management
Recreation Management	Planning and Research Management
Forest Resources Management	Planning and Research Forest Management Timber Supply
Services for the Community	Emergency Services Advisory and Management Services Recoupable Works and Services Grants to Non Government Agencies
Corporate Services	

Transition

Much preliminary work has been completed for the introduction of Program Management. An extensive review of accounting and budgeting systems and procedures was undertaken to prepare for the introduction of budgets and financial reporting by programs.

This report on operations is a transition to the new arrangement and uses approved program headings as far as possible.

As a preliminary introduction to the new methods, operating expenditure and revenue for each program was identified for the 1989/90 financial year and is summarised in the following table. In keeping with the intention that program management will not be fully introduced until 1 July 1990, this breakdown of revenue and operating expenditure has not been audited.

	Revenue \$000	Operating Expenditure \$000
Corporate Services	1 103	12 716
Wildlife Management	1 036	10 835
Recreation Management	1 641	11 612
Forest Resources Management	69 706	63 769
Services for the Community	3 579	7 917
TOTAL	77 065	106 849

Further Information

Further information about the functions and activities of the Department can be obtained from the following sources by:

- writing to the Executive Director, PO Box 104, Como, WA, 6152, or telephoning 3868811.
- visiting the operations headquarters at 50 Hayman Road, Como, or telephone 3670333.
- subscribing to Landscape, a quarterly conservation, wildlife and forests magazine published by the Department, which features current policy and management issues.

CHANGE AND ORGANISATIONAL DEVELOPMENT

Government Policy and Legislative Changes

Government policy decisions during 1989/90 affected CALM in the following ways:

1. Following consolidation of the hardwood afforestation sharefarming scheme commenced by CALM, the Government has proposed the establishment of a public company known as Tree Fund, to which CALM will become a contractor (not necessarily the only one) for site selection, seedling development and planting.
2. Expansion of the Department's Rural Advisory Service to become the Vegetation and Tree Planting Advisory Service to assist farmers to integrate trees into farming practice and provide advice on native vegetation management on farms.
3. Following a general review of timber royalties in 1989, a new set of target royalties for each grade of log from each species was announced by the Government in December to be phased in by January 1992. The first increase towards the target was introduced in January 1990.
4. CALM will play the principal role in the management of Regional Parks. A task force comprising representatives from CALM, the Department of Planning and Urban Development, Ministry of Sport and Recreation, Ministry of Local Government, Office of the Cabinet, Office of Industrial Relations, Department of Land Administration, the Public Service Commission and Treasury will propose a systematic framework for Regional Parks and the management of open space in the Metropolitan Area. It will also recommend legislative changes to enable the creation of Regional Parks.
5. A Cabinet Minute of December 1989, approved a two phase strategy to design an Integrated Land Information Program (ILIP) to develop, integrate and improve access to the Government's land information. CALM contributed a senior officer to a Public Service Commission Task Force, which was to design the Program, secure commitment to it from various Government instrumentalities involved with information on land, and execute to the maximum extent possible. This was successfully completed.
6. The Department will support the Commonwealth Department of Arts, Sport, Environment, Tourism, Territories (DASETT) in arranging the Perth 1990 international conference of the International Union for Conservation of Nature and Natural Resources (IUCN).

A Conservation and Land Management Amendment Bill was introduced into the Legislative Assembly during the 1989 Spring Session of Parliament. The amendments proposed in the Bill primarily seek to apply integrated management over the broad estate managed by the Department and to establish security of tenure and purpose for State forests and timber reserves.

Amendments have been proposed for the Wildlife Conservation Act 1950 which will enhance the protection and conservation of fauna and flora throughout the State. This Act has been amended 12 times since 1950 when it was enacted as the Fauna Conservation Act to replace the Game Act 1912-1913 and current proposals may result in substantive redrafting of this legislation.

Organisation Change

As reported last year, a proposal to abandon the separation of Policy Directors and Divisional Managers was to be subject to a trial early in this financial year. It was successful and the new

arrangements were endorsed by the Public Service Commission in January. Figure 2 shows the restructured senior portfolios and groupings of functional units.

The new arrangements are:

- . the creation of divisions of Nature Conservation and Parks, Recreation and Planning under respectively the Directors of Nature Conservation and National Parks;
- . location of the Division of Forest Resources under the Director of Forests and abolition of the position of Divisional Manager, Forest Resources;
- . regrouping of portfolios to create an Information Resources Division in lieu of the Services Division;
- . a change of name for the Division of Administration and Finance to Corporate Services;
- . Divisional Managers retitled as Directors;
- . creation of the Wildlife Branch which includes the Wildlife Protection group to function in the Division of Nature Conservation;
- . creation of a Policy and Extension Branch in the Division of Parks, Recreation and Planning.

KEY ISSUES

Public Relations and Communications

"With public sentiment, nothing can fail; without it, nothing can succeed". There are few places where this is more true than in the Department of Conservation and Land Management.

Changes in the Department's operating environment have increased the importance of effectively planned and implemented public affairs and communications activity. Conservation and land management related issues now rank very near the top of the public's agenda of concerns in WA. The issues involved are complex and emotional and they have direct impact on the economy, employment, environmental health, and the State's natural heritage. They are also often subject to controversy.

In WA, there are strong and vocal groups who are advocates of moderate to extreme conservation and environmental protection. But there are also groups whose interests are threatened by such action. Conservation and land management issues therefore automatically become the subject of substantial public debate, whether or not the Department plays a role in communicating the issues. Failure to communicate these issues effectively would ultimately undermine the Department's programs and services. Put another way, effectively planned and implemented, public awareness and community education activities can increase community understanding of, and support for, nature conservation and natural land management.

During the year, the Department took steps to increase the capabilities and effectiveness of its public affairs and community education units. These included the addition of key staff, adoption of communications planning to ensure the development of the most relevant information to the public, and improvements to the Department's internal communications program to encourage CALM staff to more effectively interact with the public.

Wildflower Picking Industry

The wildflower industry in WA has traditionally taken flowers for the trade from public lands, the pickers being licensed by CALM under the powers of the Wildlife Conservation Act. There are two current trends for change in the industry. More native plants are entering the trade through cultivation; reservation of public lands for other purposes has resulted in less land being available for commercial wildflower picking. There is also evidence of an increase in illegal picking on conservation reserves.

With the additional factor of increasing value of the industry, these circumstances create a requirement for a review of its administration. The Department has initiated discussion with representatives of the wildflower trade and seeks to establish a means for formal liaison for the proposed review and ongoing administration. Draft amendments to the legislation have been prepared.

Shark Bay

Substantial progress was made during the year with implementing recommendations of the Shark Bay Region Plan and has involved extensive consultation with the Shark Bay and Carnarvon Shire Councils and the local fishing and pastoral industries. Negotiations for the purchase of Peron Station for subsequent declaration of the Peron National Park are expected to be finalised early in 1990/91. Redesign and restructuring of public facilities on the jointly vested reserve at Monkey Mia have been implemented. These matters have been advanced in a context of public controversy relating to a proposal to nominate Shark Bay for World Heritage Listing.

Abrolhos

The first steps toward implementation of the Abrolhos Islands Study Report, adopted by the Government in 1988/89, were initiated during the year. The Abrolhos Islands Consultative Council was appointed and is serviced by the Geraldton office of the Department of Regional Development with CALM and Fisheries officers in attendance. Field studies have been carried out, in consultation with the Fisheries Department and local fishermen, to determine precise boundaries of the proposed Abrolhos National Park and Marine Park.

Captive Breeding of Endangered Species

Throughout the arid and semi-arid lands of mainland Australia there is an alarming progressive loss of native fauna, especially middle-sized mammals. Many species are now secure only on off-shore island nature reserves. The cause of this problem is still being debated and investigated. In some cases it is necessary for populations to be bred and kept in captivity to ensure against total extinction and to provide animals for subsequent relocation programs when problems with the wild habitat are understood and corrected. Toward this end the Department has established formal links with Perth Zoo for collaborative captive breeding projects. Collaborative projects on the endangered Numbat, Chuditch and Western Short-necked Tortoise have been in place for some time, with notable success, in part supported by the World Wide Fund for Nature. The new project seeks to formalise and extend these arrangements to other endangered native species. A CALM policy paper laying out appropriate strategies was finalised during the year.

Wetland Conservation

The State Conservation strategy draws attention to the progressive loss and deterioration of wetlands in the south of the State, resulting from urbanisation and eutrophication. The Department has initiated several projects in response to this.

The Royal Australasian Ornithologists Union has been commissioned to estimate the stocks of waterfowl using selected wetlands in the State, and this project has been extended to include counts in both early and late summer.

Using funds contributed by the Commonwealth Government, the EPA, the WA Water Authority and CALM, a project has commenced to determine the status of wetlands in the South West Land Division and the uses made of them by waterfowl.

A grant from the Australian Heritage Commission has enabled the Department to initiate a study of the Vasse-Wonnerup wetland to assess management needs to protect its nature conservation values.

The Department has participated in lengthy technical negotiations with developers which have resulted in measures to ensure that the water quality and wetland habitats of Thomsons Lake are not adversely affected by proposed adjacent housing development.

Nomination of Western Australian Wetlands as Wetlands of International Importance Under The Ramsar Treaty

During the year nine Western Australian wetlands were nominated via the Federal Government as Wetlands of International Importance. The wetlands are as follows:

Name	Area Nominated approx (ha)
Ord River Floodplain	130 000
Lakes Argyle and Kununurra	150 000
Roebuck Bay	50 000
Eighty-mile Beach	125 000
Forrestdale and Thomsons Lakes	754
Peel-Yalgorup System	21 000
Lake Toolibin	437
Vasse-Wonnerup System	740
Lake Warden System	2 300

The nominations were accepted by the International Union for Conservation of Nature and Natural Resources and are now formally listed under the Ramsar Treaty.

The listing represents international recognition of the nature conservation importance of these wetlands. It will enhance tourist interest in them, and will increase the Department's opportunities to raise resources, and to oversee planning, for their wise management and long term protection.

Lake Toolibin

Lake Toolibin Nature Reserve has been listed on the register of wetlands of international importance (see Ramsar above). It is one of the State's very few remaining freshwater lakes and an important refuge for waterbirds, but currently under threat of salinisation.

Pumping to lower the saline groundwater table beneath Lake Toolibin has continued. Additional piezometer units were installed to more precisely monitor the effects of the pumping and tree planting on the groundwater table. Alcoa is contributing \$225 000 over the next five years to the local Land Conservation District Committee, for land conservation work in the Lake Toolibin catchment. CALM is participating on the Committee to define specific projects on the private land in the catchment which compliment our work on the Lake Toolibin Reserve and contribute to the rehabilitation and protection of this important wetland reserve.

Predation by Foxes

The factors that have caused the loss of so many Australian mammal species have never been fully understood and have been the subject of much debate. Results of some long term ecological research have revealed that predation by the introduced European fox has been an important factor.

This research which began 12 years ago initially involved rock-wallabies. It was shown that wherever the fox was controlled, rock-wallabies increased; in the absence of fox control, rock-wallaby numbers (already dangerously low) did not change or declined. Similar experiments with six other species have produced identical responses.

As a result of this research, the fox is now recognised as a major conservation problem. A major research program has been launched to find means to bring the fox under control. CALM is a major participant and is receiving Commonwealth funds for the purpose.

In the meantime, knowledge gained from past work on baiting techniques is being applied on a localised basis to protect several populations of endangered species on conservation reserves in State Forest, a number of Wheatbelt nature reserves, Gibson Desert Nature Reserve, Kalbarri and Cape Range National Parks, and the Burrup Peninsula and Dampier Archipelago Nature Reserves.

Special attention has been given to protection of relict populations of rock-wallabies in these areas. Within two or three years of fox baiting the wallaby populations show a remarkable recovery indicating the importance of this program.

Commercial Tourist/Recreation Activities

In the 1989/90 financial year, CALM introduced a permit and licence system for commercial tourist operators using CALM lands and waters in Western Australia. Commercial tourist activities include vehicle tours or safaris, guided walks, adventure activities, instructional courses and the provision of minor facilities and services.

In its role as manager of the public estate, CALM has two major responsibilities relating to tourist activities; to protect the conservation values of the land; and, to ensure that visitors enjoy a safe and rewarding experience and develop a better understanding of the natural environment. CALM shares this second responsibility with tour operators who also want their clients to enjoy their experience.

The issuing of permits and licences enables CALM to monitor access and use of lands under its control and to ensure that the conservation values of these areas are maintained. By protecting these values the tour operator will be able to return to popular locations on many occasions and find them in an unspoiled condition.

Fees for permits introduced in 1989/90 are a fixed annual charge of between \$50 and \$250 depending on the nature of the activity. Licence fees are five percent of gross turnover. Most tour operators require only a permit. Licences are issued in the case of relatively major concessions and require the approval of the Minister for the Environment.

Community Involvement Program (Volunteer Programs)

The Department has implemented a new and exciting initiative with its program of involving members of the community as volunteer workers. Following development of policies on management of volunteers a Community Involvement Coordinator was appointed.

The Community Involvement Program seeks to formalise and streamline existing programs and identify new opportunities for volunteers. The Coordinator will also develop an awareness for the potential of volunteers within the Department, and train field-based volunteer coordinators.

The first year of the program has been very successful. Existing volunteer programs at Milyering, Penguin Island and in Marine Turtle Research have continued to grow in volunteer participation and confidence.

More than 30 programs were initiated or operated during the year, involving over six hundred volunteers.

Activities included visitor information, interpretation, campground hosting, wildlife research and survey, park rehabilitation, erosion control, visitor survey, park planning, friends groups, wildlife care and rehabilitation, wildlife rescue, historical research and work experience students.

Considerable time and energy has been devoted to communicating the basis of the program to Departmental staff, and negotiating with Trade Unions with regard to specific proposals, systems of review and notification of proposals.

The success of the program can benefit the Department in several ways. It will assist CALM staff achieve Departmental objectives, and in doing so will develop appreciation and understanding for the Department's role, and conservation and land management practices in general.

The Interests of Aboriginal People

There are very clear expectations by Aboriginal individuals and communities and other community interest groups, that CALM fulfils a very important role in the interaction between the Aboriginal communities of the State and the remainder of the community. In the Kimberley, Pilbara, Gascoyne, Goldfields, South Coast and Wheatbelt regions, CALM's presence is becoming increasingly felt and Aboriginal people are expressing a desire to become involved in conservation and land management.

During the year consultations about a range of issues of mutual concern took place with about 18 Aboriginal community groups throughout the State and also with other State and Commonwealth Government Departments interested in Aboriginal/conservation issues.

A significant new project, investigating use of CALM managed land by Aboriginal people in the southern Wheatbelt region, commenced as a result of earlier representations by the Southern Aboriginal Corporation. This information will provide an important data base for the development of future policy relating to Aboriginal interests in the South-west.

CALM continued to pursue its Aboriginal Employment and Training (AET) initiatives reported last year with the appointment of an Aboriginal officer to coordinate the implementation of the AET plan. CALM now employs a total of 29 Aboriginal people as full-time employees, and engages the services of many others as consultants and contractors.

Tree Breeding

The Department has a long and successful history in the breeding of trees to enhance forest productivity. Current emphasis is on the genetic improvement of *Eucalyptus globulus*, the principal species for the proposed pulpwood afforestation project.

Yields and growth rate from natural eucalypt forests are low and the quality of wood for pulping is low. However, young plantations of *E. globulus* have excellent pulping characteristics.

Genetic programs have been applied to substantially increase the yield and quality of the major eucalypt pulpwood species. A draft breeding and propagule production strategy for *E. globulus* in W.A. was prepared in May 1990 which details genetic resources, progress and future directions. A major objective by 1995 is to establish plantations using propagules derived from selections from early W.A. trials. Dry matter gains on these trees are calculated to be at least 40 percent.

Until recently the Department has relied upon conventional seed orchards to produce large quantities of improved genetic quality seed for use in *Pinus radiata* plantations. However, seed orchards have been shown to be inefficient for transferring genetic potential.

To counter this the advanced seed orchard technology, Heagea Artificially Pollinated Seed Orchard (HAPSO), developed by CALM, has been introduced at the West Manjimup Plant Propagation Centre. Application of the technology is in its first cycle. Pollination has been very successful. The cones are now developing on trees and will be picked in May 1991 for sowing in the pine nursery in September 1991.

Suggested Change in Purpose for Reservation

In June the Minister for the Environment approved a final management plan for the Dampier Archipelago Nature Reserves. One of the recommendations of the plan is that Parliament agree to change in purpose of the area from Nature Reserve to National Park. Most of the actions of the plan are not contingent on such a change but it was the opinion of CALM and the NPNCA that National Park was a more appropriate purpose because of the significant recreation use of the area.

The natural conservation values of the area are significant; for example, good colonies of Rothchild's Rock Wallaby, turtle nesting beaches, and the gazetted rare Pilbara Olive Python. The protection of these values will be enhanced by the zoning plan.

Royalty Review

A general review of hardwood royalties and softwood stumpages was completed following extensive consultation between the Forest Products Association, individual members of the timber industry and the Department.

The Minister approved increases in these royalties and stumpages to be effective from 1 January 1990.

Both hardwood and softwood royalties will now be indexed annually using movements in the Consumer Price Index for Perth, instead of the Timber Price Index which was used previously. The new royalties are designed to recover all the various costs for growing forests, and provide a return to the Government on the capital invested in growing the forest. Other factors taken into account include market factors such as the prices of alternate materials and imported timber.

Contracts

In January 1990, CALM became the prime contractor to supply round logs from all harvesting operations within State forest. Contracts to Supply have been signed with 23 independent contractors to harvest approximately 1.6 million cubic metres per annum of logs to various sawmilers and other log buyers. The full cost of these operations are part of the log price paid to CALM by all buyers of round logs.

As part of the Government commitment made in the Timber Strategy to provide high quality timber for value-added products, particularly the furniture industry, a total of 10 000 cubic metres of premium quality jarrah, marri, blackbutt and karri logs were sold by contract to four timber companies. As a condition of the contracts, the companies are to provide substantial amounts of money for continued research and development at the Wood Utilisation Research Centre at Harvey.

Contracts to mill sheoak logs have also been awarded to four other companies in accordance with the Timber Strategy to further encourage the renewed interest that has been shown in the use of sheoak as a decorative and furniture timber.

Utilisation of Low Quality Logs

The financial incentive provided by the restructure of hardwood royalty scales which commenced with a general royalty review in 1986 and continued in 1989 has resulted in a marked increase in sales of low grade sawlogs. Previously these logs were either utilised in lower grade uses such as firewood and fencing material or processed directly to woodchips. In many cases they were left on the forest floor as waste.

Buoyant market conditions early in the period played a significant role. The state of the market will always be an important factor in timber sales of low grade material. Sales of marri logs for conversion into sawn timber have almost doubled while sales of low grade jarrah logs have also increased.

Wood Utilisation Research

The Wood Utilisation Research Centre completed the four year \$4.63 million Small Eucalypt Processing (SEP) Study which was jointly funded by the Commonwealth Government under a Public

Interest Project grant, the State Government, and the WA timber industry. A Technology Exchange Workshop was held in Perth in May 1990 to pass on research findings.

The major result of the study has been the development of the VALWOOD process in which seasoned boards from small regrowth eucalypt thinnings can be edge-and face-glued into furniture panels or structural products. Karrivale Pty Ltd has contracted to use part of the Centre as a pilot plant for up to three years to manufacture jarrah VALWOOD. Research and development projects to assess other species such as karri, marri and Tasmanian blue gum, for VALWOOD production, are in process.

The CALM Drying System developed during the SEP Study has generated considerable interest from small sawmills who cannot afford conventional systems. The system has solar power as the main source of heat energy, and is designed to dry appearance grade timber while avoiding degrade of the surface of the boards. Another important achievement has been the development of the GUMTREE computer model which has proved to be an excellent means of assessing the economics of timber drying.

CALM received a GOLD AWARD for VALWOOD at the 1990 Government Technology Event in Canberra. This was a special Environmental Award which recognised the significant advantages that can be achieved by the new technology to utilise small trees, and recover unusually large amounts of timber to create a value-added furniture grade product which is easy to use and highly profitable.

Trees on Farms

The formation of the Tree Fund (formerly known as the Tree Trust) reported in 1988/89 report has been delayed whilst several legal, financial and operational matters are resolved.

In order to maintain the impetus in sharefarming, CALM coordinated the establishment of both pine and hardwood (mainly blue gums) as a contractor for two major timber companies in Western Australia. In addition the Department has continued its own pine sharefarming program.

A \$1.5 million project designed to develop the integration of commercial pulpwood eucalypts into agricultural systems concluded in winter 1990. It was sponsored by the Commonwealth National Afforestation Program. It developed a product called 'timberbelt sharefarming' which attracted 1 000 ha of plantings on a fully commercial basis. It also demonstrated the versatility and value of tree crops as an integral part of the farm plan, and their potential to treat land degradation.

Farmer interest in timberbelt plantings is very strong. It is anticipated that such plantings could greatly increase the land available for the eucalypt pulpwood industry and at the same time give important environmental benefits.

Non-commercial tree planting in the dryer farmland areas of the south-west, and greater interest in upgrading remnant native vegetation, as measures to treat land degradation, gained momentum during 1989/90.

In response to the strong demand by farmers and organisations for tree planting in rural areas, CALM undertook a major policy review on rural vegetation management. As a result of the review, the Government decided that a new specialist technical service should be created. This service, to be called the Vegetation and Tree Planting Advisory Service, will present comprehensive vegetation management information to farmers and coordinate the Department's activities in conserving remnant native vegetation on farms. It will also have a consulting wing which will provide commercial tree planting information and services.

Regeneration of Forests

The Department adheres strictly to the principle that all forest areas harvested for timber production are regenerated.

Policy Statements

Specific policy statements approved during the year are:

- 20 A Marine and Estuarine Reserves System in Western Australia.
- 23 Conservation and Management of Emus.
- 29 Captive Breeding and Cultivation of Endangered Species and Their Re-establishment or Translocation in the Wild.
- 31 Management of Reserves for the Conservation of Nature.
- 32 Volunteers.
- 34 Visual Resource Management of Lands and Waters Managed by CALM.

As part of the development of an Aboriginal Employment and Training Plan, a policy -

- Aboriginal Employment and Training; was also produced.

Policy Statements revised during the year are:

- 2 Basic Raw Materials.
- 26 Equal Employment Opportunity.

At an advanced stage of development are:

- Conservation of Endangered and Specially Protected Fauna in the Wild.
- Conservation and Management of Saltwater Crocodiles.
- Conservation of Native Vegetation on Rural Lands.

Several others are being developed or are in the process of being negotiated with organisations.

Consistent with the usual procedure, policies are developed by either Directors or specialist branches and before examination by the Corporate Executive are passed to regions and branches and other specialists for comment. After approval by the Corporate Executive, the documents are submitted to the National Parks and Nature Conservation Authority and/or the Lands and Forest Commission as appropriate.

THE ESTATE OF LANDS AND WATERS

Nature Reserves

Definition:

- Areas to be managed for wildlife conservation and scientific study.
- Have important conservation value, either as part of a reserve system, as a remnant or because of particular species.
- No historical commitments to inappropriate uses or activities.

The area in this category at 30 June 1990 was 10 425 883 ha; an increase of 6 844 ha during the year. Important reserves were created or enlarged at Dandaragan, Coorow, Bruce Rock and Albany.

Reserves at Nowergup Lake and Stockyard Gully have in previous years been reported as national parks; this year they have been included as nature reserves, which is more appropriate in view of their purposes.

National Parks

Definition:

- Areas to be managed for wildlife conservation, scientific study and public enjoyment.
- Have important conservation, cultural and scenic values.
- Nationally or internationally unique, in terms of landscape and/or biota.
- Size must be sufficiently great to accommodate recreation or historical uses without significantly detracting from conservation values.

On 22 September 1989 a national park of 9 169 ha was created at Mt Augustus, north-east of Gascoyne Junction. The park includes Mt Augustus itself, a significant and scenic geomorphological feature.

Two areas near Albany totalling 3 982 ha were declared as national park on 23 March 1990. These comprise the first stage of the Waychinicup National Park.

As at 30 June 1990, there were 59 national parks vested in the National Parks and Nature Conservation Authority with the following areas:

National Park	Area (ha)	National Park	Area (ha)
Alexander Morrison	8 501	Millstream-Chichester	199 746
Avon Valley	4 366	Moore River	17 543
Badgingarra	13 121	Mt Augustus	9 169
Beedelup	1 530	Mt Frankland	30 830
Boorabbin	26 000	Nambung	17 491
Brockman	250	Neerabup	1 082
Bungle Bungle	208 723	Peak Charles	39 959
Cape Arid	279 415	Porongurup	2 572
Cape Le Grand	31 390	Rudall River	1 569 459
Cape Range	50 581	Scott	3 273
Collier Range	277 841	Serpentine	4 362
D'Entrecasteaux	57 623	Shannon	52 598
Drovers Cave	2 681	Sir James Mitchell	497
Drysdale River	435 906	Stirling Range	115 661
Eucla	3 342	Stokes	9 742
Fitzgerald River	328 026	Tathra	4 322
Frank Hann	61 420	Torndirrup	3 938
Geikie Gorge	3 136	Tuart Forest	1 785
Goongarrie	60 356	Tunnel Creek	91
Gooseberry Hill	33	Walpole-Nornalup	15 877
Greenmount	58	Walyunga	1 812
Hamersley Range	617 602	Warren	1 355
Hassell	1 265	Watheroo	44 512
Hidden Valley	2 068	Waychinicup	3 982
John Forrest	1 508	West Cape Howe	3 517
Kalamunda	375	William Bay	1 739
Kalbarri	186 071	Windjana Gorge	2 134
Leeuwin-Naturaliste	16 201	Wolf Creek Crater	1 460
Lesmurdie Falls	56	Yalgorup	11 819
		Yanchep	2 799
TOTAL AREA			4 854 571

NATURE RESERVES

Nature reserves are for the purposes of wildlife and landscape conservation, scientific study and preservation of features of archeological, historic or scientific interest. Wildlife values may not be commercially exploited, and no recreation which damages natural ecosystems is allowed.

Area of "conservation of flora and fauna" reserves as at 30 June 1990 - 10 425 883 ha.

NATIONAL PARKS

National Parks are for the purposes of wildlife and landscape conservation, scientific study, preservation of features of archeological, historic or scientific interest, together with recreational enjoyment by the public. They have national or international significance for scenic, cultural or biological values.

Area of National Parks as at 30 June 1990 - 4 854 571 ha.

STATE FORESTS

State forest is managed for multiple uses including water supplies, recreation, sustainable timber production and wildlife conservation. It also provides for public utilities and mineral production, where these activities are imposed.

Area of State forest as at 30 June 1990 - 1 750 357 ha.

MARINE RESERVES

Marine Parks are managed for marine conservation and recreation, with areas zoned for commercial fishing on a sustained yield basis.

Marine Nature Reserves are managed for the conservation of marine and terrestrial flora and fauna and their habitats. Fishing and collecting are not permitted.

Area of Marine Parks as at 30 June 1990 - 263 485 ha (approx).

Area of Marine Nature Reserves as at 30 June 1990 - 132 000 ha (approx).

OTHER RESERVES, FREEHOLD LAND AND PASTORAL LEASES

Miscellaneous and timber reserves are normally transitional classifications, and in the interim may be managed for wildlife conservation, recreation or sustainable timber production.

Area of other reserves as at 30 June 1990

conservation/recreation - 188 928 ha

timber reserves - 144 399 ha.

Area of pastoral land held by the Executive Director as at 30 June 1990 - 320 957 ha.

TOTAL ESTATE

As at 30 June 1990 total area was 18 113 098 ha.

This was a net increase of 504 288 ha during 1989/90.

The terrestrial area is 7.2 per cent of the land area of Western Australia.

State Forests and Timber Reserves

Definition:

Areas to be managed for multiple use, with the primary uses in most cases being sustainable timber production and protection of water catchments.

The total area of State forest as at 30 June 1990 was 1 750 357, which is 2 490 ha more than last year's total. This increase was mainly due to the inclusion of three reserves into State forest No's 51 and 52.

The aggregate area of timber reserves did not change during 1989/90. It remained as 144 399 ha.

The following table shows the major forest types which occur within State forest, timber reserves and Executive Director land as at 30 June 1990.

TYPE	AREA (Ha)
Jarrah	1 368 000
Karri	126 000
Wandoo	106 000
Mallet	8 000
Tuart	1 000
Goldfields' species	54 000
Radiata pine	36 000
Pinaster pine	29 000
Exotic eucalypts	4 000
Very open areas	195 000
TOTAL	1 927 000

Description of Forest Types

Jarrah includes: pure jarrah; jarrah with marri, W.A. blackbutt, wandoo, W.A. sheoak and bullich as minor species; stands dominated by marri with jarrah as the minor species; stands dominated by W.A. blackbutt with jarrah or marri as the minor species; stands dominated by bullich with jarrah or marri as the minor species.

Karri includes: pure karri; karri with marri, and/or jarrah and the three species of tingle as the major or minor species.

Wandoo includes: pure wandoo; pure powderbark wandoo; wandoo and powderbark wandoo with jarrah, marri and brown mallet as minor species.

Mallet includes: plantations; natural mallet with wandoo as the minor species.

Tuart consists of pure stands only.

Goldfields species include: pure stands of salmon gum, Dundas Mahogany, Dundas blackbutt, Cleland's blackbutt, silver gimlet, sandalwood, jam and many others, or any of these species in combination.

Radiata pine includes: pure stands plus a very small area of other species, in plantations only.

Pinaster pine includes: pure stands plus a very small area of other species, in plantations only.

Exotic eucalypts include: many species in rehabilitated dieback and mined areas and in trial plots.

Very open areas includes: swampy and rocky areas; areas with sparse tree canopy; areas cleared for mining and not yet rehabilitated; powerlines and dams.

Marine Reserves

Definitions:

Marine Nature Reserve:

Areas to be managed for wildlife conservation and scientific study.
Have important conservation value, either as part of a reserve system, as a remnant or because of particular species.
No historical commitments to inappropriate uses or activities.

Marine Park:

Marine areas managed for conservation, study, public enjoyment and commercial fishing on a sustained yield basis.
Where zoning includes commercial fishing, a marine park must be large enough to allow this fishing without detracting from the overall conservation and recreational value.

On 25 May 1990 three new marine parks and the State's first marine nature reserve were declared.

Rowley Shoals Marine Park lies 260 km north-west of Broome and has an area of approximately 23 250 hectares. The park includes the Clerke and Imperieuse Reefs and is rich in corals and fish.

The Shoalwater Islands Marine Park includes waters off Peron Peninsula, Shoalwater Bay and Warnbro Sound. It has an area of approximately 6 545 hectares.

The Swan Estuary Marine Park consists of three areas adjacent to Alfred Cove, Pelican Point and Milyu (South Perth). It has an area of approximately 340 hectares and includes mudflats and seagrass beds which provide feeding habitats for transequatorial wading birds.

The Hamelin Pool Marine Nature Reserve in Shark Bay has an area of approximately 132 000 hectares and supports biological systems of scientific value.

Conservation and Recreation Reserves

The area of reserves in this category as at 30 June 1990 was 188 928 ha. A new conservation and recreation reserve was created at Cowalla Bridge in the Shire of Gingin and an 8 ha foreshore management reserve was created at Lake Clifton. Both reserves are vested in the National Parks and Nature Conservation Authority.

Freehold Land

Freehold land held in the name of the Executive Director totalled 32 518 ha, an increase of 185 ha for the year. The major portion of this land is committed to forestry operations.

Purchases

The Department purchased the following areas of freehold property for addition to various categories of the land estate:

- . 2 615 hectares near Mullewa to be reserved for the conservation of flora and fauna.
- . 985 hectares adjacent to the Fitzgerald River National Park for addition to the park.
- . 562 hectares for addition to the Jerdacuttup Lakes Nature Reserve.
- . 202 hectares near Albany for reservation as a nature reserve.
- . 171 hectares of uncleared land within the former agricultural research station near Manjimup.
- . 36 hectares of wetland for addition to the Wild Horse Swamp Nature Reserve.
- . 9 hectares of swamp at Forrestdale to be set aside as a nature reserve.
- . 6 hectares of land at Bengier Swamp as part of a program to buy the remaining freehold land within the Bengier Swamp Nature Reserve.

Additionally, a pastoral lease of 320 957 ha in the Eastern Goldfields was purchased for sandalwood conservation purposes.

WILDLIFE MANAGEMENT PROGRAM

Objective: To conserve the indigenous plant and animal species and environmental processes in natural habitats throughout the State.

The program includes responsibility for:

- . planning for nature conservation on public lands and in reserved waters;
- . research programs in flora, fauna and marine conservation;
- . management of public lands and reserved waters for nature conservation;
- . protection of ecosystems on public lands and reserved waters from damage by fire, disease, mining, chemicals, grazing, feral animals and people;
- . producing and implementing management programs for endangered or commercially exploited species;
- . management of the State Reference Herbarium;
- . regulating activities such as wildflower picking, aviculture, duck hunting;
- . preventing illegal taking of protected species from the wild;
- . liaison with local Government authorities and the Main Roads Department with respect to conservation of roadside vegetation;
- . liaison with the Department of Agriculture and rural communities with respect to the administration of the State's Remnant Vegetation Protection Scheme;
- . encouraging conservation of native species on private property and road reserves;
- . rehabilitation of conservation reserves and forests after mining and other activities;
- . coordinating emergency action such as whale stranding rescues;

Planning

Management plans

Area management plans in which nature conservation is a major component were completed during the year for:

Yanchep National Park
Logue Brook Reservoir and Catchment Area
Waroona Reservoir and Catchment Area
Ningaloo Marine Park
Dampier Archipelago National Park

Copies of the above plans, each with a summary of public submissions are available from CALM offices.

Nature Reserves: Management plans for nature reserves are designed primarily to protect their indigenous flora and fauna and to provide access, where appropriate, for study and research purposes. Management plans are well advanced for the following nature reserves:

Boyagin and Tutanning Nature Reserves are major nature reserves of the central-western wheatbelt, containing a high proportion of rare and threatened flora and with rare and endangered fauna including the Numbat, Brush-tailed Bettong, Western Quoll and Red-tailed Phascogale. A draft management plan is being prepared for these reserves.

A draft management plan for Two Peoples Bay Nature Reserve is proceeding. The reserve includes significant habitat areas for Noisy Scrub Bird, Western Whipbird and Western Bristlebird and is the site of research and translocation projects aimed at resuming these endangered species from the threat of extinction.

Interim guidelines have been prepared for Serrurier Island Nature Reserve. These incorporate the existing biological knowledge of the island including maps of the island's major vegetation units and extensive Wedge-tailed Shearwater rookeries and detail the necessary operations required for managing this important reserve. A proposal by Mackerel Islands Pty Ltd to develop a resort on Serrurier Island has highlighted the need for management planning for coastal island nature reserves.

National Parks and other categories of reserved land: Management plans for National Parks and other categories of reserved land also contain provisions for flora and fauna protection. Notes on the plans being prepared during this year which contain significant nature conservation provisions follow.

A total of 176 submissions was received following the release of the Fitzgerald River National Park draft management plan. In December 1989 a series of lightning strikes followed by extreme weather conditions eventuated in a number of major fires within the Park. The plan was reopened for public input on fire management and fire protection issues, with the 13 responses submitted arising from previous respondents. Fitzgerald River National Park is one of the richest areas for plants in Australia, and includes about 75 endemic species. The Park has a richer fauna than any other conservation area in the south-west, including the Ground Parrot, Dibbler, Heath Rat, Western Bristlebird and Western Whipbird.

The final management plan for Hamersley Range National Park is approaching completion. Issues to be resolved include those relating to traditional custodians of the Park, to the Shire of Ashburton's proposal for a southern road through the Park, and to land exchange proposals including incorporation of Mount Meharry.

Fifty three submissions were received following release of the Purnululu (Bungle Bungle) National Park and Conservation Reserve draft management plan. Responses have been collated but resolution of the final plan is dependent upon a joint effort with representatives of the Purnululu Aboriginal Corporation. This process is expected to resume in the near future.

A draft management plan for Walpole Nornalup National Park will soon be released for public comment. The Park is particularly rich in orchids, contains 4 eucalypt species confined to the Walpole area, and includes among its gazetted rare fauna 2 mammal and 4 bird species. Sites within the Park are included in the management program for the translocation of the Noisy Scrub Bird.

Work continues on the draft management plan for West Cape Howe National Park. Nature conservation values include the presence of significant invertebrate fauna, such as relict populations of spiders, and the occurrence of populations of the Western Ring-tail Possum, Dell's Skink and the Red Eared Firetail Finch, all gazetted as rare.

Approval to commence a draft management plan for John Forrest National Park was granted in December 1989. Wildlife values of the Park include remnant flora and fauna representative of the northern Darling Range, including geographically restricted flora, a colony of Euros, and indigenous

snail species. The significance of such populations is likely to increase with encroaching urbanisation of the range.

Approval to commence a draft management plan for Serpentine National Park was granted in January 1990. A survey of flora and fauna is being initiated, and a key issues leaflet is to be prepared.

A draft management plan for Shoalwater Islands is nearing completion. The emphasis is on providing for public access while protecting sea-bird nesting sites. Conservation values include significant populations of Australian Sea Lion, Little Penguin, Little Shearwater and tern species.

A draft management plan for Marmion Marine Park is in the process of being released for public comment. Some invertebrate species of special interest, e.g. the cowry shells *Cypraea venusta* and *Cypraea friendii*, have major populations in the Park. Recreational fishing is controlled under the Fisheries Act. The management plan proposes to exclude fishing from sanctuary zones which may then serve for protection and study of all marine fauna and flora.

A final management plan for Lane Poole Reserve is nearing completion. Fragile environments identified within the Reserve include moss and fern communities on granite outcrops, and communities associated with small, sometimes ephemeral, creeks. Gazetted rare fauna includes the Western Native Cat, Peregrine Falcon, Red-eared Fire-tail Finch and the Skink Lizard.

A draft management plan for Dryandra State Forest has commenced with goals and objectives being endorsed by the National Parks and Nature Conservation Authority on 20 October 1989 and by the Lands and Forests Commission on 28 November 1989. An objective of the plan will be to maintain the current diversity of flora with emphasis upon those species and communities in need of special protection. Of the 13 native mammals (excluding bats) which remain at Dryandra, 4 are listed as rare and endangered: the Woylie, Red-tailed Phascogale, Tamar and Numbat. Another rare and endangered species is the Crested Shrike-tit.

The draft South Coast Region Management Plan was released for public comment in April 1989 for five months and 165 submissions were received. Submissions have now been analysed and draft amendments to the plan are in preparation. The plan contains extensive proposed additions to the conservation reserve system along the south coast.

Preparation has begun of a Goldfields Region Management Plan. Biological data are being compiled. A review of existing conservation reserves and identification of proposed additions has commenced.

Management Programs

After consultation with the Kangaroo Management Advisory Committee and the National Parks and Nature Conservation Authority, Management Programs were forwarded to and approved by the Commonwealth Government. Commercial quotas were set at 290 000 Red Kangaroos, 45 000 Western Grey Kangaroos and 10 000 Euros.

A draft management program for the Chuditch was finalised.

Preparation of a management program for Saltwater and Freshwater Crocodiles has begun.

Research

The Department runs a Wildlife Research Centre at Woodvale and maintains wildlife research staff and programs at the Manjimup Research Centre. Research projects are also carried out by some staff in regional and district offices.

Biogeography Program

The National Rainforest Conservation Program fieldwork and write up was completed. Surveys of Shark Bay, Walpole-Nornalup National Park and Cape Arid National Park were completed. A major review of the Mount Lesueur region was undertaken and published. A survey of granitic and basaltic hill complexes in the Pilbara for relictual flora populations was begun.

A major biological survey of Purnululu National Park, Purnululu Conservation Reserve and adjacent areas was carried out during 1989 by CSIRO Division of Wildlife under contract to CALM. The survey determined 619 plant, 147 bird, 81 reptile, 41 mammal, 15 fish and 12 frog species from this area. Notable plants include 14 species new to the Kimberley and four species not otherwise recorded from Western Australia. A number of undetermined specimens may also represent new species. Notable animals include the Grey Falcon, Gouldian Finch, Desert Mouse, Large-footed Mouse-eared Bat, Northern Nail-tail Wallaby, Rock Ringtail Possum, Ningbing Antechinus, the skink *Egernia slaateri*, and undescribed species of gecko *Gehyra sp. nov.*, skink *Lerista sp. nov.* and turtle *Chelodina sp. nov.*

The fauna includes widespread, tropical (Torresian) and desert (Eyrean) elements. The species composition is more similar to that of the northern Kimberley and Top End than that of the nearby arid areas (e.g. Edgar Ranges, Great Sandy Desert). Many Torresian species reach their local (southern) range limits in the Bungle Bungle area, particularly in lowland and riparian land systems (along the Ord and Osmand, and in wet gorges). Twenty-one animal species recorded in the Bungle Bungle area are known from either no other or only one other reserve in north-western Australia.

Fauna Conservation Program

An experiment was carried out to test the hypothesis that the artificial diet currently being fed to captive numbats was inhibiting breeding. The hypothesis was disproved, as a female numbat maintained on the regular diet and another fed an increased proportion of termites both bred successfully at Woodvale, together producing a further seven young. This brings to 19 the number of numbats bred in captivity since 1985, and augurs well for the future of the breeding program run by CALM and Perth Zoo.

Ten numbat young born at Karroun Hill Nature Reserve since the translocation of numbats there in 1987-8 were captured and fitted with radio-collars. This permitted the monitoring of their dispersal and showed that their condition was excellent, indicating adequate food supply, but that predation rates are significant.

A search for the Shark Bay mouse on the mainland in the Shark Bay region was carried out. No evidence was found that it persists on the mainland, but a number of suitable reintroduction sites were located.

Surveys for ground parrots at Fitzgerald River National Park confirmed that Hamersley Drive is an important site for these rare and endangered birds. Permanent quadrats to monitor the effect of fire on ground parrot habitat were established.

Work is continuing on the distribution and ecology of *Pseudomys chapmani* (Pebble Mound Mouse), although the study is in its very early stages.

A grant from the World Wildlife fund has enabled a study to commence on the status and conservation of the western mouse, *Pseudomys occidentalis*. Trapping on Anderson Lake Nature Reserve has been carried out to collect initial data for this study.

Fire Program

Experimental burning has commenced in the Stirling Range National Park. This study aims to improve knowledge of fire behaviour and fire effects in mallee-heath vegetation. Four plots were

burnt in spring 1989 and three in autumn 1990. Initial hypotheses about the importance of wind speed and fuel moisture content on fire rate of spread and intensity have been developed. Additional data on fire behaviour under extreme weather conditions were gathered following the extensive wildfires in the Fitzgerald River National Park in late 1989.

Vertebrate and invertebrate studies in the Stirling Range National Park are progressing. A large component of the beetle fauna collected comprises new species, including a new southerly species of a restricted group of Cicindelids.

After four years of intensive monitoring of invertebrates and small vertebrates, an experimental burn on a 100 hectare block of Tutanning Nature Reserve was carried out in March 1990. Monitoring of the site will continue to determine the effects of fire on the fauna. In addition, a population of the rare dasyurid *Phascogale culura* was studied before and during the experimental burn by means of grid-based trapping and radio tracking. This latter work is a joint project with the Fauna Conservation Program and is funded externally through the ANPWS Endangered Species Program. Monitoring of the *P. culura* populations will continue.

Plots established in south-west forests to examine the long term effects of fire on the vegetation were burnt in spring 1989 and autumn 1990. A detailed assessment of vegetation in plots which were burnt and plots which remain unburnt was carried out prior to burning. Seedling regeneration following the fires will be assessed in spring 1990. One of the study areas was established in 1972 and several plots have been burnt 6 times since then. A preliminary analysis of data has shown only minor changes in the vegetation composition under this extreme fire treatment. A study area containing the rare *Lambertia rariflora* was experimentally burnt in autumn 1990. The responses of the *Lambertia* population will be monitored.

Thickets of *Melaleuca viminea* which occur in broad valleys on the eastern margin of the jarrah forest were surveyed for their suitability as habitat for the rare Tammar wallaby. Degenerate thickets east of Collie were burnt in autumn 1990 to create a new, healthy thicket. When the thickets have developed (in about 10 years) Tammars will be re-introduced from the Perup Nature Reserve east of Manjimup. The development of the regenerating thickets will be monitored annually. Other areas are planned for burning next autumn.

A landform soils map of the Perup Nature Reserve has been compiled and together with Landsat satellite imagery and GIS, will be used to enable Tammar habitat conditions to be optimised. A plant response master file for the Warren Botanical sub-district was completed. The file contains about 1900 records and documents species responses to fire and dieback.

Current disturbance ecology research on birds includes an eight year long study in permanent sites in karri forest in Gray forest block. Following a two year period of calibration, sites were either burnt, small group (3 hectares) felled, clearfelled or left as controls. Mistnetting, censusing and foraging observations have been used to study the birds for five years after the operations. The structure and floristics of the vegetation are also assessed annually.

A second aerial patch-burn was successfully executed by the Goldfields Region in the Gibson Desert Nature Reserve in September 1989. An area of about 70 000 ha was patch-burnt in preparation for the re-introduction of two rare and endangered mammals scheduled for May 1991. The project team is aiming to attract outside funding for the re-introduction project. ANPWS, through the Endangered Species Program, has provided funds for fox control studies in the Reserve.

Studies of the effects of fire on desert vertebrates are progressing. Plots in the Queen Victoria Springs Nature Reserve have been burnt and post-fire trapping is ongoing. Field work in relation to a study of fire effects on vegetation is continuing. In the Gibson Desert Nature Reserve pre-fire trapping of lizards to study the effects of patch-burning is completed. A survey of extant populations of *Petrogale lateralis* in the Central Ranges region in conjunction with the Ngaanyatjarra Council was completed.

Aboriginal people from Pupiylala Tjarutja Inc. were contracted to undertake prescribed burning for wildfire prevention of the Neales Junction Nature Reserve. The project, funded by the ANPWS contract Employment Program for Aborigines in National and Cultural Resource Management has been highly successful with some 280 km of strategic buffer burning being achieved in 10 days.

Flora Collections Program

New temporary specimen housing for the public access Reference Herbarium and the general collections will alleviate some of the overcrowding of the specimen storage areas of the Herbarium. The new areas have been designed to accommodate the herbaria of fungi, algae, bryophytes and lichens as well as monocot families.

The WA Herbarium specimen database now comprises 85 000 entries and includes information on the Type collection, the family Rutaceae and the State's fungal collection. A grant of \$11 600 from Australian National Parks and Wildlife Service has enabled the databasing of the Herbarium's voucher collections of Declared Rare Flora and the Priority One taxa of the CALM Reserve Flora List. The census of vascular plants is now databased and is referred to as the Herbarium's taxon database WACENSUS.

Flora Conservation Program

Publication of a book on "Western Australia's Endangered Flora" has generated considerable interest both within Western Australia and elsewhere in Australia. This publication should not only foster increased public interest in flora conservation generally but will hopefully also encourage direct public involvement in future volunteer projects involving Endangered Flora. The book will also be a valuable reference on endangered flora and poorly known species at risk for CALM Regional and Operations staff.

Two Wildlife Management Programs "Declared Rare Flora and other plants in need of Special Protection in the Northern Forest Region" and *Eucalyptus rhodantha* have been published and are the first dealing with endangered flora. The *E. rhodantha* management program demonstrates the value of detailed studies on population genetic structuring, breeding systems and population dynamics in developing management strategies for endangered plant species. Similar studies have been completed or are near completion for a number of endangered species such as *Banksia cuneata*, *Banksia tricuspis*, *Acacia anomala* and *Stylidium coroniforme* which will provide the basis for Wildlife Management Programs for those species.

Flora Information Program

A workshop on regional flora writing was held at the Herbarium in October 1989. The workshop discussed the most efficient way to generate and disseminate taxonomic information. A new user-friendly flora handbook format has now been proposed and will be implemented in a new pilot project to be submitted for approval in July 1990.

The enormous task of preparing the manuscript of the Flora of the Kimberley Region is nearing completion. The project, which has taken five years to date, keys out and describes all of the flowering plants recorded in the Kimberley Region.

Preliminary design work has been done for a planned geographic database and checklist of the flora of the Pilbara.

Marine Conservation Program

During its first full year of operation the program has begun to draw together existing research resources from within CALM, other government departments, tertiary institutions and private agencies into a framework capable of providing a scientific basis to marine conservation in WA.

A substantial research effort has been brought to bear on the problem of *Drupella* within Ningaloo Marine Park, including several studies within CALM (partly funded by ANPWS) and others from the University of WA and Murdoch University. A one-day workshop including representatives of all research programs was successfully held to coordinate future work. Research into the early life history of *Drupella* achieved a major breakthrough in inducing egg-laying and larval development. This is the first documentation anywhere of these processes for this genus.

In response to concerns of deteriorating water quality, water sampling was carried out at Monkey Mia and at Coral Bay. Bacterial and nutrient analyses were undertaken for a number of sites in winter, spring and summer. Results suggest that for Monkey Mia there may be a large seasonal changes water quality.

Several long-term programs have been established which rely on data collection by regional staff or the public. Examples are the recreational fishing survey at Marmion Marine Park and the reef assessment project. Both projects have begun to return data which will build into a valuable historical record over time.

The marine turtle project was continued with recruitment of further volunteer participation in field work and additional external support provided by WAPET, operators of the Barrow Island oil-field. The operators of the Harriet Oil-field also continued to encounter volunteer work being done on Varanus Island.

Cooperative involvement of CALM operational staff and Aboriginal community members was also maintained. The first remigrant green turtles were seen at the Lacepedes and Barrow Island and further recoveries were received from Northern Territory coastal locations.

The project work was given further recognition via an invitation to join the IUCN/SSC Marine Turtles Specialist Group.

The dugong survey of Shark Bay and Exmouth Gulf was successfully completed in collaboration with external researchers and CALM operations staff.

Plant Diseases Program

A Research Scientist and Technical Assistant have been established at the Manjimup Research Centre to undertake research on the plant diseases in the South Coast and Southern Forest regions.

Trials on the control of *Phytophthora* species with phosphoric acid have been extended to *Banksia* communities on the south coast. *Banksia baxteri*, *B. brownii* and *B. coccinea* were sprayed in November 1989 and monitoring is continuing.

An investigation of the causes of decline and death of *B. coccinea* at Cheyne Beach was commenced.

In May work was carried out in the Two Peoples Bay Nature Reserve by a CSIRO team to test the possibility of mapping dieback infections from satellite imagery. Several sites for research on management methods for control of *P. cinnamomi* are also located in the Two Peoples Bay Nature Reserve.

A number of canker fungi, including *Botryosphaeria* and *Diplodina*, have been isolated from dying plants and pathogenicity tests are in progress.

From mid May 1989 to mid April 1990, 319 cultures were forwarded by the detection service for identification. Sixty four of these were *Phytophthora* species all of which were identified to species level and added to the database.

Appendix 14 lists research publications of 1989/90.

Management

Land Management For Nature Conservation

All land managed by the Department is managed to sustain nature conservation values as far as possible, regardless of the purpose of reservation. In the case of Nature Reserves and National Parks, nature conservation is the primary management objective. In other land tenures it is a significant purpose but may be subordinate to other land uses.

Management of land for nature conservation involves a range of activities including fire management, control of feral animals and weeds, and control of access by people seeking to use the reserves for recreation or study purposes. Wetland reserves pose special problems with respect to maintenance of water quality which can be affected by conditions in the catchments beyond the boundaries of the reserve itself.

Damage by off-road vehicles is prevalent throughout the conservation reserve system, especially in coastal reserves where people seek access through dunes to the beach. Road maintenance and rehabilitation of damaged tracks and parking areas consume large amounts of resources. The problem can be mitigated by appropriate road location and construction which are important aspects of reserve management plans.

Considerable effort has been addressed to installation of signs identifying the status of national parks and reserves throughout the State. It is disappointing that the signs are frequently vandalised.

Salinisation of many inland wetland reserves is causing severe and progressive deterioration of habitat and flora and fauna. Eutrophication of both inland and coastal water bodies is also causing problems. Solution to these problems is largely beyond this Department's control. An example where, in collaboration with other agencies and nearby landholders, corrective measures are being taken, is Lake Toolibin Nature Reserve (see section KEY ISSUES).

Fire Management

Technical advice and services are provided by the Fire Protection Branch although routine fire management programmes are carried out largely by regional staff. The following notes refer to the Department's whole fire management programme, including that attributable to Wildlife Management.

Draft fire management plans and interim guidelines for necessary operations for three (3) national parks, and eight (8) nature reserves were developed. Six (6) of these plans have been approved and five (5) are in various stages of preparation and approval. Fire control working plans for fire emergency preparedness have been reviewed and approved for all forest districts and South-western regions.

Detection: Nine aircraft were employed on fire surveillance duties at six bases in the south-west. 6130 hours of aerial surveillance were flown at a cost of \$104.27 a flying hour. Four lookout towers in key pine forest areas were manned and a further twenty towers were maintained in readiness to provide emergency backup to the aircraft.

Weather Forecasts: A comprehensive forecasting service was provided by a private meteorological company during the fire season at a cost of \$48,000. This service included regular daily forecasts for 11 nominated locations in the south-west plus spot forecasts for other areas throughout the State.

Daily weather and fire behaviour forecasts were entered into the Department's computer to assist district staff during the fire season.

Aerial Prescribed Burning: Two fixed wing aircraft were contracted for aerial ignition of prescribed burns. 320 hours were flown and 63 burns covering 240,495 hectares were undertaken.

Further details are in Appendix 9. Operational trials of Spinifex burning took place in the Pilbara Region in May.

Fire Towers: A thorough inspection and review of all fire towers has taken place. The structural safety of each tower has been assessed and remedial work programmed. Due to advancing years and the ravages of time several towers may have to be demolished within the next few years as they pose a safety threat to visitors and staff alike. The incidence of vandalism occurring at these sites gives cause for concern.

Research and Development: Design, development, testing and implementation of a range of fire systems, facilities, equipment and publications has continued.

Considerable attention has been given during the year to the ecological effects of regular burning in different vegetation types, particularly on the relative effects of spring versus autumn burning, frequency of burning, the risk of severe damage by wildfire if areas are left without planned burns, and the use of fire to maximise species diversity in native vegetation. These are critical issues for management of land for nature conservation purposes. Several research projects are current on this matter (see Research, above).

Other points of interest are:

- Following more extensive operational experience with the Control centre vehicle several minor modifications have been made and additional staff have been trained in its use. This unit is now based at Kelmscott Regional Headquarters.
- Development work has been successfully completed on an aerial drip torch capable of working from a helicopter. This unit will be of great value in igniting slash and certain shrubland fuels which presently cannot be successfully lit using the conventional fixed wing aircraft system.
- The system of displaying resources disposition at large fires has been further refined. The system gives fire controllers a rapid appreciation of a fire situation and enables better planning of shift changes.
- Further development work has taken place in the Fire Resources Recording System particularly as a computer based information system.

A summary of the Department's fire fighting equipment and its location is given in Appendix 10.

Suppression of Wildfires: 325 wildfires were attended by the Department during 1989-90. Of these 241 were in the south-west forest regions while 84 were in other regions. 155 were on State Forests, 45 on national parks, 21 on nature reserves, 50 on other Crown lands and 54 on adjacent private property.

The largest wildfire in CALM's history occurred in December 1989 in the Fitzgerald River National Park. 152 600 ha were burned. CALM staff, equipment and local brigades from a wide area were called on for assistance. A major contribution was made by the people of Ravensthorpe, Jerramungup and Quaalup, Shires and businesses by providing meals, other supplies and accommodation.

There were 111 wildfires in State hardwood forests which burned 1 491 hectares.

There were 44 fires in Departmental pine forests covering 165 hectares. One fire in softwood forest near Wanneroo burned 133 hectares. This fire was deliberately lit.

6 175 hectares were burned in the Hamersley Range National Park by a lightning caused fire.

A large fire burned 36 000 hectares in the Prince Regent Nature Reserve. The fire was detected in April 1990 but it is suspected it started several months beforehand. No suppression action was taken.

In the Cheyne Beach Nature Reserve 4 200 hectares were burned by wildfire.

A further 1 800 hectares were burned in Parry's Lagoon Nature Reserve. This fire burned through grassland only.

146 fires were deliberately lit by unauthorised persons. This is 45 percent of the total number of wildfires on public land under the Department's control.

Wildfires and areas by land categories are given in Appendix 11.

Training: A series of Fire Management, Fire Weather and Spotter Pilot courses were conducted for Departmental staff as well as for representatives of other fire combat and support organisations.

Feral Animal and Weed Control

The Department is responsible for control of declared weeds and feral animals on reserved land under its management. In many cases these non-native species have damaging effects on native flora and fauna and habitats.

A bait factory to prepare large (120-200gm) meat baits for fox control was set up at the APB's Forrestfield centre. Freezers were provided for storage. Over 30,000 baits were produced and distributed this year, mainly to the Wheatbelt Region.

Control of other feral animals continued, particularly cattle and donkeys (Kimberley), goats (Greenough), pigs (State Forests) and rabbits (South West). In the Goldfields, feral camels are causing severe damage to some nature reserves. 131 camels were shot on the Yeo Lake Nature Reserve.

Liaison was maintained with the Agriculture Protection Board, its regional advisory committees and zone control authorities in implementing the Department's weed and feral animal control programs. Zone meetings were attended at Busselton (2) Kalgoorlie (1) and Lake Grace (1).

Dieback Disease

A dieback protection plan for the Moora District was prepared and released. *P. cinnamomi* has now been recovered from Eneabba, a substantial extension in range. Liaison with mining companies was maintained with respect to dieback control measures during their operations. Dieback hygiene measures have been implemented at both the Cooljarloo and AMC Eneabba mineral sands operations. A research trial into the use of phosphoric acid as a means of enhancing the natural ability of plants to resist phytophthora attack has been instigated.

A major review of dieback policy and hygiene practices is nearly complete. Liaison and training of departmental cadets, industry, ranger and Main Roads' staff continued.

Quarantine for dieback control continues in areas of State Forest. Vandalism of signs and gates and breaches of regulations occur. Restrictions of finance and staff availability hamper control efforts. Assistance with survey and hygiene procedures was provided to several mining companies, petroleum exploration crews and the Main Roads Department.

Mining on Public Land Under CALM Management

There is close liaison with the Mines Department, Department of Resources Development and the Environmental Protection Authority to ensure that the Department is represented on a number of committees and working groups associated with mining.

Revenue from compensation for mining on public land under the Department's control was \$1.55 million.

A new Government policy on exploration and mining in National Parks and Nature Reserves is being implemented. Twenty three permits containing agreed operating conditions for geoscientific surveys have been issued to industry and Geological Survey of WA. Under the new policy applications were received to open D'Entrecasteaux National Park, the Plumridge Nature Reserve and Watheroo National Park to mineral exploration.

Several applications for mining tenements referred to CALM have been approved with appropriate environmental conditions. Successful negotiations of financial guarantees has facilitated this process in the Goldfields.

Field inspections ensure compliance with conditions. However, problems are continuing with gypsum operations in wheatbelt reserves and with access to basic raw materials (sand and gravel pits) in reserved lands. Stronger action is required to ensure that these activities are conducted in a proper manner. Continuing concerns regarding the impact of gypsum mining in the Lake Campion Nature Reserve have been referred to the EPA.

Departmental representatives were heavily involved in the assessment of potential impact of various mining proposals on existing or proposed reserves including Lake Muir (peat), Hill River (coal and power), Jangardup and Beenup (mineral sands) and Onslow (solar salt). Petroleum projects assessed included Roller No 1 exploration well and Murion Islands seismic study. Assessment of utilities proposals included the Northern Terminal Powerline, Collie Power Station, Adelaide to Perth Optic Fibre Cable and the Margaret River Town Water Supply.

The Department was involved in supervision of ongoing mining operations on land managed by the Department, e.g. updated bauxite mining plans, management of petroleum interests on Thevenard Island and management of mining exploration in Rudall River National Park. The working party on quarrying has completed its report which is now being distributed for comment.

Soil Conservation

The Department continues to be represented on the State's Soil and Land Conservation Advisory Committee. A National Soil Conservation Conference was held in Perth during the year. A number of important issues including clearing of native vegetation, drainage and protection of remnant vegetation were discussed. A draft Environmental Protection Policy for groundwater, wetlands and associated ecosystems on the Swan Coastal Plain has been prepared by a Committee which included representation from CALM.

Kangaroo Management

Kangaroo management continues, directed towards damage control and ensuring the maintenance in the wild of viable populations of the three species which are known to damage crops, property and native vegetation. The commercial take in 1989 was 185 000 Red Kangaroos, 28 000 Western Grey Kangaroos and 5 000 Euros.

The 1990 aerial survey of Western Australian kangaroo populations was commenced, continuing the triennial pattern established by surveys in 1981, 1984 and 1987. The survey was conducted by the Australian National Parks and Wildlife Service with financial assistance from this Department.

Emu Management

The previously gazetted open seasons for the Emu were cancelled. Damage control will now be undertaken through the issue of Damage Licences.

Interest in expansion of the emu farming industry continued during the year. The number of emu farms licensed under the Wildlife Conservation Act increased from nine to seventeen. Capture of emus from the wild was not permitted.

Crocodile Management

The Department continued to give high priority to policy development for the protection and management of crocodiles, particularly Saltwater Crocodiles, and to informing the public about safe behaviour in crocodile habitats.

The Wyndham Crocodile Farm was established and commenced collecting limited numbers of Saltwater and Freshwater Crocodiles for stocking purposes, under a licence issued by the Department of Conservation and Land Management. Preparation of a crocodile management program commenced. The Wyndham Crocodile Farm conducted and reported on a survey of Saltwater Crocodile numbers in the Cambridge Gulf area in October 1989, and a survey of crocodile numbers in King Sound, Stokes Bay and part of the Fitzroy River was conducted in November 1989 by a consultant engaged by the Department, using funds provided by the Fremantle Crocodile Park.

Aviculture Licensing

The Department completed an extensive review of licensing requirements in relation to the keeping of native birds for hobby purposes. The review was conducted in consultation with avicultural groups and culminated in amendment of the Wildlife Conservation Regulations. The amendments simplified the licensing system and increased the number of bird species which can be kept without a licence, while still retaining licensing requirements for species where such controls are considered necessary to protect wild populations.

Cockatoo Management

The previously gazetted open season for Baudin's White-tailed Black Cockatoo and Carnaby's White-tailed Black Cockatoo were cancelled, with damage control now covered by the issue of Damage Licences.

Wedge-tailed Eagle Management

The previously gazetted open season on Wedge-tailed Eagles was cancelled, with damage control now covered by the issue of Damage Licences.

Wildflower Picking

1 694 licences were issued authorising wildflowers to be taken for sale from Crown and private land. A further 1 217 licences were issued to pick for scientific, education and other specific reasons. See KEY ISSUES for further comment and Appendix 15 for more detail.

Beekeepers Consultative Committee

A previously informal consultative group was formalised by the Hon Minister. The committee includes representatives from the WA Farmers Federation, Commercial Beekeepers Cooperative, Honey Pool, Apiarists Society, National Parks and Nature Conservation Authority and Department of Agriculture. The Committee is chaired by the Director of Nature Conservation and serviced by the Environmental Protection Branch.

The objectives of the committee are to ensure two way communication between the Department of Conservation and Land Management and Industry and to provide advice to the Hon Minister.

During the year the committee met four times and made significant input into a draft beekeeping policy, a proposal for changes to the regulations to allow more sites to be held in remote areas at less cost, and a range of other matters relating to management of land utilized for apiary purposes.

Duck Shooting

Open seasons for duck shooting in 1990 were declared by the Minister. A four-week restricted season was declared in the South-west and Eucla Land Divisions and a year-long season was declared for the rest of the State.

Endangered Flora Management

The data base of locality records and other information on endangered flora has been computerised this year. The intention is to network this to regional and district offices to assist field staff and the public to comply with the endangered flora protection regulations during field operations.

A Grant (\$44 250) under the ANPWS Endangered Species Programme has provided the resources to increase our knowledge of declared endangered flora in the Merredin District, and to develop a management plan for their conservation (see section on Commonwealth Government Assistance).

Two Flora Management programs (Eucalyptus rhodantha and Declared Rare Flora and Other Plants in need of Special Protection in the Northern Forest Region) were also published. These programs are now being implemented by CALM.

Flora programs dealing with Declared Rare Flora and Other Plants in Need of special Protection in the Metropolitan Region and the Merredin District are in preparation.

Fencing materials (1 200 metres) were provided to private landholders in the Wheatbelt Region for protecting declared endangered flora on their properties.

Endangered Fauna Management

Many native animals have vanished from some reserved land where they were once common. During the year a policy paper was approved, laying out procedures for captive breeding and reintroduction programs.

The initial research work is done by Research Division but with the aims of transferring responsibility to regional operations staff when the techniques are established for any given species. Several such "rescue" programs are currently at the research and early development stages.

The Noisy Scrub Bird is a case where successful translocation work is well underway. Twenty one Noisy Scrub-birds were transferred to Quarram Nature Reserve, west of Denmark, in 1989 in an attempt to establish a colony there. Volunteers as well as CALM officers are involved in scrub-bird capture and release projects. Monitoring of release areas was carried out in September 1989 and May 1990, to check on progress. Locations of single male scrub-birds were mapped in the Albany-Cheyne Beach area including the two sub-populations in Two Peoples Bay Nature Reserve.

Another translocation effort involves the Greater Stick Nest Rat. This native species was once common in the Shark Bay area but is now extinct on the Australian mainland. The species is breeding successfully on an island in South Australia. A group of 40 animals were brought from South Australia and released on Salutation Island in Shark Bay in during 1990. South Australian and CALM biologists collaborated in this project. A project is being developed by CALM staff for reintroduction of endangered mammals to the Gibson Desert Nature Reserve from the Barrow Island Nature Reserve. This project involves collaboration with local Aborigines. A similar project is proposed by CSIRO and the Useless Loop Biosphere Project Committee for the translocation of

endangered mammals from Bernier or Dorre Island to a site on Heirisson Prong in Shark Bay. Both projects will involve prior eradication of feral foxes from the translocation site.

Efforts to prevent local extinction of Rock Wallaby populations on reserves at a number of reserves throughout the State are proving successful by poisoning to control foxes (see KEY ISSUES).

Generally, sea turtle nesting sites are on beaches on the shores of nature reserves or national parks but some sites are not protected in this way. The Cowrie Beach Flatback turtle rookery south of Port Hedland has been documented, barricades to prevent vehicle access positioned and appropriate signs erected. Operations have been financed by the Shire of Port Hedland, whose Rangers will continue to visit the rookery throughout future nesting seasons. An interpretive sign will be jointly funded by CALM and the Shire of Port Hedland, to a cost of \$500, for the 1990/91 season.

Wildlife Protection

Wildlife Officers detected 236 offences against the Wildlife Conservation Act and Regulations during the 1989/90 financial year. In accordance with the objective of seeking compliance with legislative requirements numerous other minor offences were dealt with by Wildlife Officers issuing verbal warnings or providing advice. Appendix 17 provides details.

The majority of reported offences this year continue to involve the illegal taking of protected fauna and flora. Other more serious offences include one of attempting to smuggle fauna out of the country, and seven cases of unlawfully taking declared rare fauna and flora.

Twenty one cases already dealt with during the 1989/90 financial year have resulted in fines totalling \$6 510 with costs totalling \$1 259. Eighty six cases resulted in letters of warning being sent to offenders, and a further 120 cases are pending.

The decline identified last year in specific types of offences such as parrot nest robbing and illegal kangaroo shooting has continued this year. Investigations have revealed, however, that in the case of parrot nest robbing, there exists a small, hard-core of individuals, specializing in the highly valued and sought after species such as Red-tailed and White-tailed Black Cockatoos. These people are threatening known breeding sites of these birds through constant interference with nesting birds and taking young from nest hollows for the avicultural trade. Investigations are continuing.

Patrols of off-shore islands, particularly reserves, in the Department's patrol vessel "Pseudorca" were continued which last year involved a total of 166 hours running time. In addition, assistance was provided to an extensive survey on the south coast to assess the breeding success and population status of Australian Sea-lions and New Zealand Fur Seals on off-shore islands between Albany and the easternmost islands of the Recherche Archipelago, east of Esperance.

In the north of the State, Wildlife Officers dealt with some 21 reports involving problem crocodiles, and investigated one crocodile attack. This resulted in the capture and relocation of five troublesome crocodiles. One crocodile involved in an attack at Oombulgurri was destroyed.

The expansion of the educational role of Wildlife Officers has resulted in a higher profile in such activities as addressing schools, clubs, organisations and interested groups on wildlife and conservation matters in general.

Environmental education activities performed by Wildlife Officers are very popular and make a significant contribution to improving environmental skills, knowledge and attitudes in the community.

Marine Parks And Nature Reserves

Late in the year gazettal notices were tabled in Parliament for the declaration of the Hamelin Pool Marine Nature Reserve and the Rowley Shoals, Swan Estuary and Shoalwater Islands Marine Parks.

Declaration of these marine areas substantially increases the range of WA marine habitats represented in conservation reserves.

The Hamelin Pool Marine Nature Reserve (approximately 1 320 square kilometres) is the first marine nature reserve in Western Australia. The reserve will provide protection to the stromatolites and other geological deposits found in the area. Plans for the development of road access and construction of a broadwalk for viewing the stromatolites at Hamelin Pool have been instigated.

The Shoalwater Islands Marine Park will undoubtedly become an important recreational resource for the Metropolitan area as well as providing protection for significant marine flora and fauna.

A Working Group seeking to identify coastal areas needing special management, and possibly reservation, has continued its work. A comprehensive report on WA coastal marine habitats and candidate areas for possible reservation in the Kimberley and Pilbara, is in preparation.

Proposals for marine parks in Shark Bay and the Abrolhos are continuing to be developed.

Marine Mammals

The Department of Conservation and Land Management has the responsibility of protection of marine mammals in State waters through the Wildlife Conservation Act 1950 as amended.

"Whale watching": In August 1989, a commercial whale watching industry was established in Western Australian waters, in particular between Hillarys and Rottnest Island, and on a small scale at Albany. This industry is in the main based upon the southward migration of Humpback Whales returning to Antarctic feeding grounds after spending winter in the warmer northern waters where they mate and calve. The Albany based section of the industry principally targets the Southern Right Whale.

Patrols by Wildlife Officers were maintained through the period of migration to monitor the activities of licensed vessels and private boats. A large scale campaign informed the public of the whale watching guidelines and provided advice on whales generally.

These patrols maintained a high profile by CALM Wildlife Officers and no major incidents were observed.

A Rottnest ferry operating from Hillarys collided with a Humpback Whale on 1 October 1989. This vessel was not involved in whale watching activities at the time. The collision was fully investigated by CALM and Marine and Harbours.

Dolphins: Departmental staff participated in a review of feeding regimes for dolphins at Monkey Mia, following concerns expressed by townspeople involved with the tourism industry. Consultant veterinarian Dr N Gales provided a comprehensive report on the matter and his recommendations on the amount of food, type of food, and frequency of feeding were adopted. The basic principle followed is that the dolphins are to be fed only a portion of their estimated daily requirements so that they are obliged to fend for themselves to some extent.

The Department also became involved in a new wild dolphin-human interaction affair now operating at Bunbury, and held discussions with the proprietors of the Atlantis dolphinarium about the inadequacy of the dolphin pools there.

A dolphin was caught and drowned in an unattended set net in Port Hedland. Recent changes to Fisheries legislation requiring nets to be constantly attended will hopefully reduce the incidence of such deaths.

Strandings: Wildlife Officers attended 34 reported whale and dolphin strandings involving both dead and live animals. Data was recorded from ten species and three whales were held briefly for rehabilitation and returned to sea.

One whale stranding was recorded with a Pilot Whale beaching itself at Onslow. Local townspeople successfully returned the animal to the sea and it progressed out to deep water monitored by an oil company helicopter.

Nineteen Australian Sea Lions and two Fur Seals required attendance by Wildlife Officers during the year, most of which were injured or ill.

Dugong: There have been further consultations with Aborigines in the Kimberley about hunting dugong. The One Arm Point Community have imposed their own quota and are conducting their own surveys of dugong numbers in that area.

An aerial survey of the Shark Bay dugong populations estimated the total population there to number about 10 000. This indicates that Shark Bay supports one of the world's largest dugong populations in spite of its relatively high latitude.

The Department continues to record Dugong sightings during Dampier Archipelago aerial surveys. It has been established that Dugongs are permanent residents in the Dampier Archipelago and that they are concentrated in two major feeding areas.

Seals: CSIRO and Murdoch University scientists continued a survey program aimed at determining the distribution and abundance of Australian Sea-lions and New Zealand Fur-seals in Western Australia. Their work represents the first attempt at a systematic survey of the populations of both species. The Department of Conservation and Land Management provided funds from the Nature Conservation and National Parks Trust Account as well as staff and logistical assistance.

Conservation Of Native Species On Private Property And Road Reserves

Road reserves: Departmental activity in this area is directed through the Roadside Conservation Committee for which there is a separate report in this publication. The Committee puts major emphasis on encouraging the protection of roadside vegetation and the voluntary setting-back of fences to provide a wider and more viable reserve. Considerable support is received from the MRD, Westrail and the Country Shire Councils Association.

Remnant Vegetation Protection Scheme: This program is jointly administered by the department of Agriculture (lead agency) and CALM. Resources from CALM's Wheatbelt Region have again provided most of the Department's contribution to the running of the Scheme. Its major aim is to protect privately owned remnants of native vegetation for nature conservation purposes. CALM has been responsible for defining selection criteria and for assessing the relative merits of areas proposed for financial assistance with fencing.

In 1988/89 110 farmers entered the scheme and 7 855 hectares have consequently been protected by fencing and a Heritage Agreement on the land title. While there have been fewer applicants in 1989/90, the rejection rate has been much lower, and the scheme should again prove to be very successful. The second year of this three year program has now been completed: two hundred and twenty one applicants sought fencing subsidies, and grants totalling \$450,000 were made to 187 successful applicants. Over the two years a total of over 15,000 ha of remnant vegetation in some of the most highly cleared parts of the Wheatbelt have been fenced under this scheme. The Department is also addressing ways to encourage the necessary protective management of these privately owned reserves.

Rural Advisory Service: Demand for advice, especially from Land Care districts, still runs at a high level in most districts in the South West. In the Geraldton Region field days on trees and revegetation were held and other farmer-organised days attended. Trial work on the establishment of Sandalwood continues with plots now set up in Northampton, Mullewa, Mingenew, Morawa and Carnamah. The level of maintenance of agroforestry plots at Allanooka, Encabba and Badgingarra is increasing as pruning and thinning continues.

Performance Evaluation

Indicator:

The extent to which the biology and management requirements of native species are understood.

Measures:

It has not yet been found possible to quantify this indicator. However, the Department has 12 internal research programs working towards achievement of the objective. It also has good liaison with external research organisations engaged in the same fields. Emphasis is placed on converting research findings into management techniques, ensuring that current research is relevant to conservation and land management priorities, and that research knowledge is disseminated. To this end, the programs are regularly reviewed and prioritised. During 1989/90, 44 research projects were inspected and modified where necessary. Seminars and workshops for operational staff are maintained and findings are published in a variety of documents. Research Scientists contribute to all land management plans.

Indicator:

The extent to which the major ecosystems, fauna and flora are represented in reserves.

Measures:

Nature reserves increased by 6 844 ha in 1989/90.
National parks increased by 13 151 ha in 1989/90.
Three new marine parks and one marine nature reserve were created during the year.
One conservation and recreation reserve and one foreshore management reserve were created.
Reviews are current for adequate representation of ecosystems and landscape in six regions.
A Working Group is proceeding to identify coastal areas for possible reservation.

Indicator:

The extent to which the survival of endangered species is assured.

Measures:

It would be desirable to have a Species Management Program for each gazetted endangered species of plant and animal. However, this is an impossible goal as there are 120 endangered animals (plus nine species declared as being in need of special protection) and 247 endangered plants on the State lists. Management programs are available for one animal (Noisy Scrub Bird) and one plant species (*Eucalyptus rhodantha*). Programs are being prepared for several other endangered species.
To deal with the remainder, collective management programs for endangered flora are dealt with on a Regional or District basis. A program for the Northern Forest Region was approved during the year and several others are in preparation.
A policy, Conservation of Endangered and Specially Protected Fauna in the Wild, was completed and promulgated during the year.

Indicator:

The extent to which management programs exist and are implemented for wildlife species.

Measure:

Species Management Programs for kangaroos are reviewed annually and adequately implemented to achieve the objectives. A management program for both saltwater and freshwater crocodiles is being prepared. There is a management program for only one exploited plant species (*Boronia*) but a general management program for commercially picked flora provides for management of the wildflower picking industry.

Indicator:

The extent to which management plans exist and are implemented for nature conservation.

Measures:

Five area management plans were completed and approved for implementation by the Hon Minister during the year. Each has nature conservation as a major component. Facets of 12 other management plans already approved are being implemented in the Department's works programs.
Seventeen other area management plans are in preparation.

Indicator:

The extent to which illegal exploitation of native flora and fauna is eliminated.

Measure:

The elimination of illegal exploitation is unlikely to ever be realised. It is also difficult to quantify the extent of effectiveness because of the number of variables which have to be considered. For example, statistics quoting fewer apprehensions of wrong-doers do not necessarily mean resources are being more effectively used. These resources may have been directed to perform functions in other areas less likely to produce apprehensions, and the level of illegal exploitation may be just as bad as it was previously. It may even have worsened in the absence of a visible deterrent. However, there were 236 offences under the Wildlife Conservation Act in the year 1989/90. Of these, 120 are pending, 86 were warnings, 21 prosecutions resulted in fines of \$6 510, and costs of \$1 259. Nine offences resulted in no further action.

Indicator:

The extent to which the status of exploited resources is managed within desired conservation parameters.

Measures:

The Kangaroo Management Program, which receives Commonwealth Government approval, sets quotas for the numbers that may be taken of the three species concerned. The commercial take in 1989 was - 185 000 Red Kangaroos, 28 000 Western Grey Kangaroos, 5 000 Euros. Monitoring ensured that the quotas were not exceeded.

Emu Farming: Eight new emu farm licences were issued. Monitoring of the industry ensured that emu farm stock originated only from captive sources.

Wildflower Industry: The activities of pickers were subject to frequent inspection. Fifty nine offences were reported.

Duck Shooting: A four week long restricted season was declared for the South-west and Eucla Land Divisions and a year long season for the rest of the State. Duck populations continue to be monitored to detect instances of illegal shooting.

Indicator:

The extent to which ecosystems are protected from the adverse impacts of fire, disease, noxious weeds, feral animals and mining.

Measure:

It is not possible to quantify this indicator. It would require a massive expenditure of resources (financial and human) to accurately determine the full extent of the problems across the whole State. Rather, as problems are systematically discovered in planning and field operations, appropriate remedial action is taken.

Thus:

- . prescribed burning for protection was completed over 278 364 ha of the estate;
- . an impact evaluation assessment for dieback disease is conducted wherever field operations are contemplated. Appropriate operational strategies are then used;
- . strict hygiene conditions are imposed on operations in all dieback free forests;
- . systematic programs for the destruction of noxious weeds and feral animals to the extent of available finance are in place;
- . through legislative control, conditions, including requirements to rehabilitate land after operations, are placed on all exploration permits and mining leases affecting CALM lands;
- . a research program is in place to discover more about the biology of the coral predator snail *Drupella cornus* and snail/coral interaction;
- . research into the biology and control of defoliating insects in the jarrah forest is being undertaken.

RECREATION MANAGEMENT PROGRAM

Objective: To facilitate the public enjoyment and understanding of the natural attributes of public lands and reserved waters in a manner that does not compromise conservation and other management objectives.

The program includes responsibility for:

- . planning appropriate recreation opportunities and their management on all lands and waters entrusted to CALM;
- . training of Aboriginal people to assist with management of parks;
- . providing public education and information programs to increase community understanding and support for nature conservation and natural land management.

Planning

Management Plans

Area management plans in which recreation is a major component were completed during the year for:

Yanchep National Park
Logue Brook Reservoir and Catchment Area
Warooka Reservoir and Catchment Area
Ningaloo Marine Park
Dampier Archipelago National Park

Copies of the above plans, each with a summary of public submissions, are available from CALM offices.

Completion of the final management plan for Fitzgerald River National Park is anticipated early in 1991. Completion of the plan has been interrupted by the very severe fires of December 1989. As well, there were over 180 submissions to the draft plan issued in July 1989. The management philosophy for the Park in terms of public use is to provide low key facilities and services which minimise changes to and complement the natural environment. This is particularly acute in view of the threats posed to the park values from dieback. Recreational activities include nature study, sightseeing, bushwalking, camping and recreational fishing.

Responses to the Hamersley Range National Park draft management plan have been analysed and a final plan is nearing completion. The Park has outstanding recreational values stemming mainly from the spectacular arid landscape and the deep gorges of the northern escarpment. The principal recreational opportunities in the Park are camping, sightseeing, bushwalking and photography.

Responses to the Purnululu (Bungle Bungle) National Park and Conservation Reserve draft management plan have also been collated, and progress toward the final plan is expected to resume in the near future in concert with traditional custodians of the Park. Purnululu is valued by visitors for the opportunity it offers for a "wilderness" experience, complemented by the cultural heritage of the area.

The draft management plan for Walpole-Nornalup National Park was prepared and released for public comment shortly after the completion of the reporting period. Recreation activities which are compatible with conserving the Park's values will be encouraged, including camping, canoeing, pleasure driving, fishing and bushwalking.

The West Cape Howe National Park draft management plan is nearing completion. Park values include extremely popular recreational fishing areas, and sites rated among the best in Australia for rock climbing and hang gliding.

A draft management plan for John Forrest National Park was initiated in December 1989 with the appointment of a Plan coordinator and a Planning Team. The proximity of John Forrest National Park to Perth suggests exciting prospects for recreation and interpretation, including facilities for disabled and for the aged.

Approval to begin preparation of Serpentine National Park draft management plan was granted on 15 January 1990. Recreational opportunities include sightseeing, picnicking, bushwalking, nature study and photography.

The draft management plan for Rudall River (Karlamilyi) National Park is on hold pending Government consideration of a Social Impact Study prepared by Murdoch University. Although natural values of the Park are high, its isolation results in only a thousand or so visitors per year, most of whom are from Telfer (just north of the Park).

The draft plan for Two Peoples Bay Nature Reserve is proceeding. Provision has been made for picnicking, access to beaches and extension of the existing nature trail.

A draft management plan is being prepared for Boyagin and Tutanning Nature Reserves. Recreation appropriate to the vesting of both reserves will be encouraged.

A final management plan for Lane Poole Reserve is nearing completion. The Reserve presents numerous opportunities for river and forest based recreation, including canoeing, swimming, marroning, fishing, picnicking, bushwalking, painting, nature study and sightseeing (generally vehicle based).

A draft management plan has commenced for Dryandra State Forest with goals and objectives being endorsed by the NPNCA on 20 October 1989, and by the LFC on 28 November 1989. Emphasis will be upon providing for recreational activities which are nature-based and not in conflict with the primary objectives of forest management.

The Marmion Marine Park draft management plan is in the process of being re-released for public comment. Recreational fishing, scuba diving and snorkelling, boating and surface water sports including wind surfing and water skiing, comprise the primary public activities in the Park.

Other plans in various stages of preparation include:

South Coast Region, Regional Management Plan
Goldfields Region, Draft Regional Management Plan
Leschenault Peninsula
Kemerton Park (in abeyance).

Landscape Planning

Landscape planning and design advice was provided to Regional and District staff on a variety of projects, ranging from the development of recreation areas, and road planning to building placement. Plans prepared and awaiting implementation include:

- . Fitzgerald River National Park - site re-development plans for the East Mount Barren carpark and lookout.
- . Stokes National Park - a conceptual site plan for Fanny Cove camping area.

- . Cape Le Grand National Park - a site re-development plan and specifications for the Thistle Cove carpark.
- . Cape Range National Park - site development plans for Yardie Creek day use area and for a new camping area at Bloodwood Creek.
- . Purnululu (Bungle Bungle) National Park - site development plans for future camping areas at Kurrajong and Bellburn.
- . Hamersley Range National Park - site development plans for Weano and Fortescue Recreation Areas.
- . Yanchep National Park - plans and specifications for the realignment of the park entry road and the refurbishment of the reticulation system.
- . Leeuwin-Naturaliste National Park - plans and specifications for a toilet block at Ellensbrook historical homestead.
- . Shannon D'Entrecasteaux National Park - rehabilitation and site development plans for Black Point camping area.
- . Walpole-Nornalup National Park - a re-development plan for John Rate Lookout.
- . Torndirrup National Park - plans and specifications to upgrade pedestrian access at the Gap.
- . Stirling Range National Park - design completed for a park office.
- . A site development plan for a new camping area at Lefroy Bay on Ningaloo Station adjoining the Ningaloo Marine Park.
- . Porongurup National Park - site development plan for Tree in the Rock carpark.
- . Marrinup Townsite and Prisoner of War Camp - a master plan which provides for the development of day use and interpretative facilities and the protection of historic values was prepared for these 2 areas west of Dwellingup. As part of the planning process, the University of Western Australia's Centre for Prehistory was engaged to carry out a detailed survey and assessment of historical and archeological features.
- . Tone River Settlement - planning in conjunction with the Ministry of Sport and Recreation is underway to develop a camping area on the area of the old forestry settlement.
- . Preliminary plans to lease and utilise Golden Valley Homestead as an information/resource centre and caretaker's residence were prepared.
- . Recreation master plans were prepared for other reserves including Garden Island and the Spectacles Wetlands. Plans for the latter area have been developed in consultation with Alcoa of Australia and various community and special interest groups.

Other work included an assessment of landscape values for the Mt Lesueur area and the provision of technical advice to Environmental Protection Authority consultants who were engaged to prepare a report on Western Australia's major landscapes. This latter work, which has resulted in the preliminary identification and description of over 40 separate landscape character types, builds on earlier landscape inventory and assessment work completed by the Department during the last 3 years.

As well, District and Regional staff were actively involved in helping to plan and coordinate a number of forest-based recreation activities and events, including the second running of Rally Australia.

Considerable progress has also been made on the formulation of a recreation framework plan for the Northern Forest Region in consultation with various user groups and State Government and local authorities.

Interpretation plans were outlined for proposed projects at Kalbarri National Park, the Shark Bay area, Millstream-Chichester National Park and its Homestead Visitor Centre.

Planning Involving Aboriginal Interests

The planning and management of conservation reserves, particularly in the remote parts of Western Australia, is increasingly attracting the interest of Aboriginal people.

Wherever CALM has responsibility for lands of traditional interest to Aboriginal people, extensive consultations are required to facilitate the protection of natural and cultural values.

Consultation has been ongoing this year with respect to the Purnululu (Bungle Bungle), Millstream-Chichester, Hamersley Range and Rudall River National Parks. Discussions have also occurred regarding proposed new reserves in the Kimberley, Pilbara, Gascoyne and Goldfields regions.

Research

Many of the findings from the Department's scientific research programs reported upon in the Wildlife and Forest Resource Management Programs impact on the responsibilities of this program.

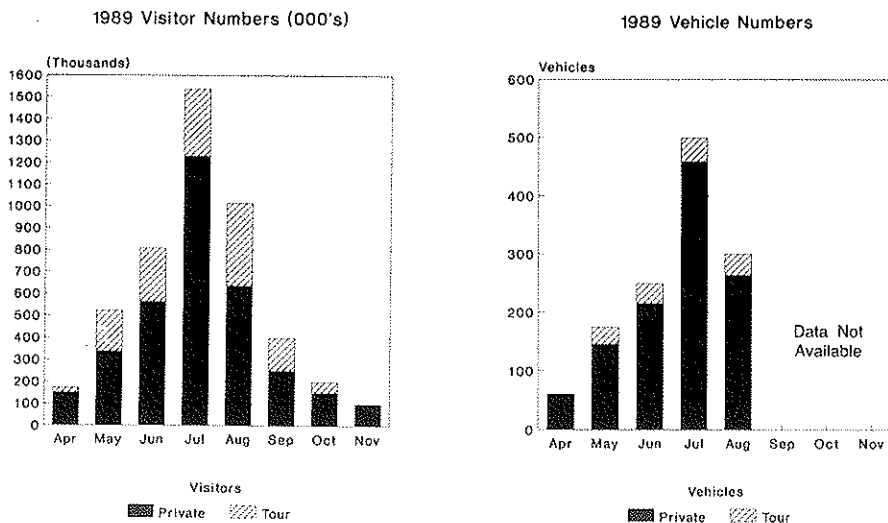
Research that is particular to this program is:

Visitor Data Collection Program

The program for collection of visitor data in CALM lands continued. More than eighty traffic counter devices were operating in 47 parks, reserves and forest areas throughout the State. Data was centrally processed and summarised using microcomputers. In addition, visitor surveys and observation studies were carried out.

The following table of information is indicative of the data which is being collected and the form of presentation. As data builds up, yearly comparisons and trends will emerge and reports will be made available for each of the parks, reserves and forest areas being monitored.

Visitor Information Purnululu (Bungle Bungle) National Park



A comment card survey to ascertain public expectations in a Metropolitan area park was conducted. Ninety nine per cent of respondents were satisfied with their visit to John Forrest National Park and made favourable comments about their experience in the Park. This survey indicates an extremely high level of satisfaction with the opportunity and experience of recreation in this national park.

The survey was replicated in another park in the south west with similar results. More surveys of this type are planned for other Parks in the State.

Analyses and results of visitor data have contributed to improved recreation management planning, site design and recreation policy.

Research Involving Aboriginal Interests

A significant new project commenced investigating the use of CALM managed land by Aboriginal people in the southern Wheatbelt and South Coast regions. This project involves interviewing local Aboriginal people about their activities and interests in natural bush lands. By the end of June a total of 20 interviews involving 120 Aboriginal people had been conducted. The information will be collated and reported in the following months.

A further research project was conducted this year in the Buccaneer Archipelago to document the major biological, cultural and social resources of the area. A consultant was contracted to carry out this study and the Bardi Aborigines Association Inc. were also contracted to assist in the collection and recording of information. This information will be useful in the future preparation of a management plan for the area.

Management

National Parks

An ongoing program of progressively improving and/or rehabilitating existing recreation areas and updating visitor information facilities was carried out in a number of National Parks throughout the State. At the same time, several new areas and facilities were constructed in those parks with an approved management plan. The impetus for much of this work has come from a Parks Improvement Program funded through a \$5 million capital works grant spread over a three year period. 1989/90 is the second year of the program. Works commenced and/or completed during the year include:

- . Windjana Gorge National Park - development of new campground loop and installation of toilets, showers and information shelter.
- . Tunnel Creek National Park - installation of an information shelter.
- . Geikie Gorge National Park - completion of sealing of access road, construction of new public toilets and ranger ablutions and installation of gas barbecues.
- . Purnululu (Bungle Bungle) National Park - completion of access and internal road realignment, installation of staff and visitor residences at Three Ways park headquarters, relocation of mobile ranger camp, installation of visitor information shelter at Three Ways entry, sinking of bore at site of future Bellburn camping area and commencement of airfield construction.
- . Mirima (Hidden Valley) National Park - completion of self-guiding interpretive trail.
- . Drysdale River National Park - installation of entry sign.
- . Millstream-Chichester National Park - substantial completion of restoration of Millstream Homestead as a visitor information and interpretation centre and installation

of visiting officer accommodation. A concrete crossing was built near Crossing Pool campsite.

- . Hamersley Range National Park - redevelopment of Knox Gorge carpark and installation of self-administered fee collection system at existing park camping areas. Parts of Joffre Falls road were re-sheeted.
- . Cape Range National Park - further development of camping areas and facilities at Osprey Bay and Pilgrammuna, provision of day use areas and facilities (toilets, information shelters, gas barbecues, sun shelters and parking areas) at Sandy Bay and Oyster Stacks, construction of an animal hide at Mangrove Bay, installation of bores and solar pumps at Shark's Tooth and Mangrove Bay sites and continuation of road redevelopment program between Mandu-Mandu and Pilgrammuna.
- . Kalbarri National Park - redevelopment of vehicle access and parking areas and installation of toilets at Hawks Head and Ross Graham Lookouts, continuation of site redevelopment and rehabilitation work at Red Bluff and Pot Alley coastal gorges and commencement of work on the realignment and upgrading of the existing access track to Natures Window.
- . Nambung National Park - installation of visitor shelter at Hangover Bay.
- . Avon Valley National Park - commencement of sign upgrading and construction of 4 toilets.
- . Walyunga National Park - completion of landscape rehabilitation and sealing of carpark at Walyunga Pool, and reconstruction and sheeting of walk trails to Syd's Rapids.
- . Yanchep National Park - upgrading of park signs, replacement and installation of new gas barbecues, purchase of hire boats and further improvements to cave lighting were completed.
- . John Forrest National Park - construction of a 500 metre wheelchair accessible trail was completed along with the continued upgrading of day use facilities.
- . Yalgorup National Park - site development plan prepared for Martin's Tank camping area and work commenced on the installation of a water pump and toilets.
- . Leeuwin-Naturaliste National Park - completion of road network and walk trail access at Ellensbrook and construction of parking areas at homestead and beach, signposting and installation of gates on management tracks through the Park, completion of site rehabilitation at Contos Springs and the development of Redgate in accordance with the management plan. This later work included the installation of a new road network, parking area, beach access, visitor lookout and toilets. The access road to Lake Cave has been sealed.
- . Shannon-D'Entrecasteaux National Park - development of camping and day use areas and provision of a boat ramp at Lake Jasper was commenced in accordance with the management plan.
- . Walpole-Nornalup National Park - park signage was upgraded.
- . Mt Frankland National Park - work on signposting the Park was carried out.
- . Torndirrup National Park - work on the Cable Beach stairway was completed and a visitor observation platform installed at Natural Bridge.

- William Bay National Park - a beach stairway to Green's Pool was constructed and 2 carparks redeveloped. An information panel was installed.
- Stirling Range National Park - the Moingup Springs toilet block was re-roofed, an information bay installed. A section of the Bluff Knoll access road was reconstructed by the Gnowangerup Shire and work was commenced on the rehabilitation and upgrading of portions of the Bluff Knoll walk trail.
- Fitzgerald River National Park - following the December 1989 wildfires, a community volunteer program was launched to carry out various park rehabilitation projects. Three working bees were organised during which erosion control, seeding and litter clean-up operations were undertaken. A new carpark, toilet and signs were also installed at Mylies and the access road across Culham Inlet was repaired and flood control devices installed.
- Cape Arid National Park - an information bay installed.

Nature Reserves

Although Nature Reserves are not set aside for recreation, there are a number of sites where passive recreation is an appropriate activity or where there is a long standing precedent that certain activities take place. During 1989/90 recreation and visitor facilities were installed at:

- Boyagin Rock Nature Reserve - realignment and upgrading of existing summit nature trail.
- Burra Rock Nature Reserve - installation of visitor information shelter, signs, toilets, picnic facilities and rehabilitation of disturbed areas.
- Cave Hill Nature Reserve - construction of toilets and installation of signs and day use facilities.
- Lake Dumbleyung Nature Reserve - construction of a walking track and observation point.
- Rowles Lagoon Nature Reserve - construction of a small camping area and installation of picnic facilities, toilets, information shelter and signs.
- Two Peoples Bay Nature Reserve - redevelopment of Little Beach carpark, realignment of road and beach access, rehabilitation of disturbed areas and installation of toilets and visitor information.
- Victoria Rock Nature Reserve - installation of additional picnic facilities, toilets, information shelter and information brochure dispenser.

Forests

Projects of special interest which were commenced and/or continued during the year include:

- Gooralong Park - further work was undertaken on the construction of a vehicle based tent camping area. Portions of the Bell Plantation situated in the park were also thinned in accordance with landscape management guidelines.
- Big Brook - further work was completed on the formation and establishment of a 4 km wheelchair accessible trail which extends around the reservoir.

- Cascades - redevelopment of vehicle access and parking areas continued and new picnic facilities were installed.
- Gloucester Tree - the Pemberton community assisted in constructing a protective railing around the tree and in loosening compacted earth around its root zone.

In addition to these projects, operations staff carried out an extensive program of site rehabilitation, upgrading and maintenance in numerous other forest recreation areas.

Other Areas

- Matilda Bay Reserve - reconstruction of a visitor lookout at Pelican Point.
- Leschenault Peninsula Park - further work was carried out on the construction of the boat-in campsite on the Peninsula, the upgrading of vehicle access, the provision of visitor information and the ongoing rehabilitation of disturbed areas.
- Golden Valley Tree Park - various work was carried out including the partial development of a wetland-waterfowl area and the installation of a water point and hand pump near the information shelter.
- Kalgoorlie Arboretum - construction and landscaping of a dam, redevelopment of vehicular access and walking tracks and the provision of picnic facilities, information shelter and toilet.
- Icy Creek - showers were installed at the Icy Creek Bush Camp in accordance with the ongoing development of this facility in the Lane Poole Reserve.
- Garden Island - new signs were placed in the areas open to the public.

Aboriginal Interests

Aboriginal people have been able to participate in a variety of operational projects through employment contracts in nature conservation related work. A total of three contracts were carried over from the previous financial year and completed this year and twelve new projects were commenced. The contract employment program is a joint State/Commonwealth exercise, with CALM providing material and capital costs and ANPWS providing the wages component. See also the section of this report, Commonwealth Government Assistance.

The training of a Community Ranger for the Pupiyala Tjarutja group of the Great Victoria Desert was completed in December 1989. The Community have acquired ongoing funding to enable the continued employment of this ranger in the area. The training of CALM's Aboriginal Trainee Park Rangers has continued. Two trainees successfully completed the first part of their training at the Purnululu (Bungle Bungle) National Park. They are now enrolled in a certificate course at Katherine College in the Northern Territory, which they attend on block release from their Park duties.

Community Education and Interpretation

Community Education and Interpretation are important aspects of the Department's work. The Department is committed to the principle that it is managing land and natural resources, and conserving indigenous wildlife on behalf of the public of Western Australia. Consequently, particular importance is placed on informing the public of the Department's activities and wherever possible involving the public.

All CALM offices provided pamphlets and information to the public relating to recreation opportunities on CALM lands, and on natural history subjects.

The Department mounted displays with a nature conservation theme at district shows, shopping centres, and at other venues on request. The level of activity associated with these services can be gauged from the Northern Forest Region who recorded a staff commitment of 1700 person-days over the year to establish 65,000 public contacts.

The Department's Planning Branch staff provided advice to Shires regarding the preparation of management plans for Shire bushland reserves.

All the Department's Regions provided a variety of public information by issuing local press releases and advertising in the local newspapers. In particular, the Southern Forest Region ran a comprehensive public information service through their local newspaper, submitting 30 press releases and inserting 40 advertisements giving topical information varying from recreation activities to the availability of free firewood to the public.

Kimberley Region produced and distributed the first issue of an annual broadsheet providing updated information on the region's national parks, their facilities and activities available to visitors.

The Metropolitan Region provided consultative services to tourists and recreationists through formal involvements with the Recreation Fishing Advisory Committee and the Rottnest Island Environmental Standing Committee.

The Western Australian Herbarium's plant advisory service provided 2,548 identifications to the general public, 1,686 for the Department of Agriculture, 7,080 for the various regions and districts of CALM, 200 drug and forensic identifications and serviced 1,000 telephone enquiries. In addition, numerous lectures to community groups were given by Herbarium staff.

As part of the restructure of the Flora Collections Program, some 15,000 specimens were databased, including a large proportion of the conservation taxa considered Rare and Endangered. Approximately 5,000 specimens were exchanged with kindred botanical institutions throughout the world.

Tree planting, native vegetation and plantation management enquiries from the public and Government agencies, were handled on a regular basis by Rural Tree Advisory staff in Como and four major regional centres.

Advisers provided technical direction and support in a number of rural land tree establishment programs and demonstration projects. They contributed silvicultural information at seminars and workshops on vegetation management.

A private forest growers organisation, several land conservation groups and other community and interdepartmental working groups, benefited from input by CALM Rural Advisers. The level of demand for this type of service can be gauged from the activities of one rural advisory officer who handled 271 enquiries during the four months March to June 1990.

CALM officers provided support and advice to Land Conservation District Committees largely through membership of the Committees.

In all regions and the Metropolitan Area, the Department continued to respond to requests to address public gatherings. Of significance were functions throughout the State associated with Arbor Day. Public talks included addresses to the Royal Australian Institute of Parks and Recreation Conference held in Perth, the Rottnest Island Authority Environmental Education seminar and the Western Australian Teachers' Union.

CALM continued to be involved with the University Extension Course involving studies of the ecology and management of Perup forest and Perth wetlands; organisation of Bushcraft Courses and support of Expedition Skills courses conducted by the Ministry of Sport and Recreation.

The Community Education publications series evolved to include the production of Arbor Activities booklet for teachers, group leaders, CALM staff and parents; reprint and production of additional Resource Notes; a Marine Resources Directory and a Tree Directory (as part of the Arbor Activities booklet); reprint of the "Exploring Granite Outcrops" booklet; preparation of a guide to CALM's educational resources.

In conjunction with the Primary Education and Challenge Centre at Karratha, the Department conducted a project on management planning for the Burup Peninsula. Topics included marine and terrestrial ecology and Aboriginal sites.

Display material at the Milyering visitor centre in Cape Range National Park is continually being upgraded. A herbarium for plants of the region has now been created.

A video disc system explaining the recreation opportunities and special characteristics of the area was installed at the Exmouth District Office which is also the Tourist Bureau.

CALM is represented on the Islands of Green Committee which is funded by the South West Development Authority. Islands of Green aims to enhance the environment of the Greater Bunbury area by planting 2 million trees and shrubs on public land by 1992. The Department's involvement this year was the provision of technical advice to the committee and assistance with supervision of planting 40,000 trees.

A film and video library comprising 169 titles was maintained for loan to conservation and public interest groups.

Personal interpretation activity programs in the regions during the year included boat tours of Geikie Gorge, guided tours of the Yanchep caves, and holiday programs for visitors to Yanchep, Leeuwin-Naturaliste, Walpole-Nornalup and D'Entrecasteaux National Parks.

A number of display shelters and signs providing interpretive material were established during the year, including shelters at Lake Dumbleyung Nature Reserve, Kalbarri National Park, Millstream-Chichester National Park and five Goldfields sites.

Interpretive trail side signs were produced for the Ochre Trail within Dryandra Forest.

In the Marmion Marine Park signs were significantly upgraded.

Interpretive walks were conducted in the Stirling Range National Park during awareness week.

Assistance was provided to the Shire of Lake Grace with the development and interpretation of the Southern Central Wheatbelt Heritage Trail, and to the Broome Botanical Society with the development of an interpretive trail in the Broome vine thickets.

Consultation with the Perth Zoo and Underwater World in interpretive design subsequently saw the provision of CALM display materials appropriate to these venues.

Interpretive activity training sessions were conducted for volunteers of Penguin Island and Canning River, and preparation was made for the July Earth Education Course with visiting lecturer Professor Steve Van Matre. Over 500 participants have now attended Earth Education courses sponsored by CALM in Western Australia.

During 1989/90 Community Education and Interpretation staff were involved with two Advanced and three Introductory Recreation Planning and Management Courses (Albany, Perth, Pt Walter,

Millstream) and Wildlife Officers were addressed at their annual seminar in community education and interpretation techniques.

The Community Education publications series evolved to include the production of an Arbor Activities booklet for teachers, group leaders, CALM staff and parents; reprint and production of additional Resource Notes; a Marine Resources Directory and a Tree Directory (as part of the Arbor Activities booklet); reprint of the "Exploring Granite Outcrops" booklet; preparation of a guide to CALM's educational resources.

Public Relations

The Department's public relations and communications activities are designed to strengthen links between the Department and the public by:

- . Improving public awareness and understanding the Department's conservation and land management programs, services and policies;
- . Overcoming entrenched negative views of conservation and land management initiatives;
- . Increasing public support for conservation and land management initiatives; and
- . Promoting wider cooperation in the prevention and solution of conservation and land management in problems.

During 1989/90 some 90 news releases and information bulletins were released. Eighty five new publications aimed at a general audience were put into production, 20 publications were reprinted, and some 42 technical/research orientated publications were produced (see Appendix 14).

A communications plan for LANDSCOPE, WA's conservation, forests and wildlife magazine, was developed, and four issues of the magazine were prepared by sale by subscription and through newsagencies. A subscription drive launched near the end of the year was having success among teachers and schools throughout the State.

A new saleable publication, entitled Western Australia's Endangered Flora was launched in April. A comprehensive guide to all 238 plants declared endangered in WA, it is available from major bookstores or direct from CALM and is selling well.

Two other saleable publications, a guide to the significant places and natural environment of northern WA, entitled North West Bound, and a comprehensive guide to the tree and tall shrub species native to the Perth Metropolitan Region, entitled Leaf and Branch, are in preparation for release in the new year.

Wild Places, Quiet Places - A guide to the significant places and the natural environment of the south-west - topped the 10,000 sales mark and was reprinted to meet continuing public demand.

CALM News, the Department's monthly newsletter was distributed to a state-wide media and interest group audience, resulting in improved awareness of departmental activities.

Displays and other promotions were mounted at local shows and community events throughout the state to celebrate such events as Arbor Day, Environment Day, Sea Week Careers Day, and local community festivals. A CALM sponsored Arbor Day poster event attracted almost 8,000 entries from over 150 schools. During Western Australia Week, a store-wide display at Aherns in Perth City focused public and media attention on rare and endangered WA flora and wildlife.

Performance Evaluation

Indicator:

The extent to which public expectations of opportunity and experience are satisfied.

Measures:

A comment card survey in two national parks (one in the Metropolitan Area, one in the South-west) revealed that 99 per cent of respondents were satisfied with their experience.

In the Rainbow Coast Tourism Awards, CALM won the cultural/heritage section with design and construction of recreation facilities and a heritage trail.

Indicator:

The extent to which recreation resource values are maintained and protected from inappropriate or excessive use.

Measures:

Five newly approved management plans contain recreation strategies which will not compromise conservation of the environment.

More than 70 recreation sites across the CALM estate were developed or rehabilitated. An additional 21 plans were prepared.

Indicator:

The extent to which the public is more understanding and supportive of nature conservation and natural land management.

Measure:

Public contact with CALM's community education initiatives and publications has increased.

This is indicative of a rising public awareness of environmental issues and a desire to be better informed.

FOREST RESOURCES MANAGEMENT PROGRAM

Objectives:

Within those areas of forest designated for multiple use, to manage commercial timber production on a sustained yield basis and to increase productivity of the forest.

To ensure a negotiated and even flow of log products to the timber industry while recovering costs for the service supplied, establishment and growth of replacement resource, and to maximise profit to the State.

This program includes responsibility for:

- . Planning for and management of State hardwood forests for multiple use;
- . Planning management and development of softwood plantations together with softwood and hardwood sharefarming schemes;
- . Management and conservation of sandalwood on Crown lands and regulation of the sandalwood industry;
- . Research into all aspects of forest ecology, timber production and wood utilisation;
- . Management of the supply of log products from CALM lands to the timber and other industries;
- . Planning, research and advice to Government on timber production in the State.

Planning

Management Plans

- . A draft management plan was commenced for Dryandra and Highbury State forests. Goals and objectives for the plan were endorsed by the NPNCA on 20 October 1989 and by the LFC on 28 November 1989. Natural resource data has been compiled, including timber resource available within the mallet plantations, so that management prescriptions can be sensibly formulated. The final management plan will develop strategies for more efficient production from those areas designated for sustained forest production.
- . A final management plan for Lane Poole Reserve is nearing completion. The recreation zone is being assessed for its current and potential recreation and landscape values, and silvicultural criteria for wood production will be reviewed. Visually prominent areas will be delineated and excluded from commercial timber utilisation. Other areas will be excluded from cutting if needed to protect water values or the aesthetic value of roadside vegetation. Appropriate management will be prescribed to rehabilitate fire degraded or dieback damaged jarrah stands.
- . The final management plans for Logue Brook Reservoir and Catchment Area, and for Waroona Dam Reservoir and Catchment Area, were approved by the Minister on 18 December 1989. Production of wood is a primary objective - shared with water production - of both catchments.

Logging Plans

The major review of logging planning procedures, commenced last year, is near completion. Major changes identified in this project have already been incorporated into current logging plans.

In the Northern and Central Forest Regions the 2, 5 and 15 year logging plans for hardwood forests were updated. In the Southern Forest Region the 1 year logging plan was prepared.

1, 2 and 20 year pine logging plans were completed and distributed for Central Forest Region districts. In the Northern Forest Region a comparable set of 2 year plans were completed and distributed while progress was made towards the longer term plan updates.

Forest Inventory

The photography phase of the Jarrah Inventory Project was completed during the year. The photo interpretation and ground plot measurement phases of the project are continuing on schedule and the field data collection target date for completion of 31 December 1990 is expected to be achieved. 844 ground plots representing 422 000 ha were assessed.

3 550 ha of hardwood forest was assessed to confirm logging plan estimates in the Central Forest Region. In the Southern Forest Region, a further 150 ha of private property and 320 ha of State forest/Timber Reserves were assessed as part of evaluations for potential land exchange.

217 pine plots were remeasured within the Central and Southern Forest Regions and the South Coast Region for resource estimate, silvicultural and nutritional studies.

10 karri regrowth and 2 old growth plots were assessed as part of the ongoing growth measurement program.

17 truckloads of logs were measured to check the product segregation and weight scaling procedures and rules.

Dieback disease identification and mapping associated with forest resource utilisation is interwoven with that for mining in many cases. ALCOA commenced funding of 4 staff members during the year to assist in mapping dieback within the company area of operations. A total area of 24 260 ha was mapped for dieback disease as a part of the Forest Resources Management program.

Additional to this was a project covering dieback evaluation around 255 drill holes for ALCOA.

Photography for future dieback disease mapping projects (inclusive of resource management, mining, wildlife and recreation management purposes) throughout the three Forest Regions covered 30 700 ha.

The softwood forest records databases were maintained during the year. Additional development to the information system was carried out by the commencement of digital capture of pine plantation information into the Geographical Information System at Kelmscott and by creation of an efficient update/interrogation database of plantation yield information for the Central Forest Region based in Bunbury.

Hardwood forest records databases were maintained during the year. Steps have been taken to implement a more efficient system while maintaining reliability of these records by greater utilisation of the departmental fire spotter planes to take photographs to verify the data collected for inclusion into the records system.

Visual Resource Planning

Assistance was provided by Landscape Branch to operations and planning staff on a number of landscape planning matters including the assessment of hardwood and softwood operations and plantation establishment. During the year, a visual resource inventory and assessment to the Blackwood Valley plantations was completed and advice provided on the development of logging plans for Folly Plantation. Similarly, advice on visual resource management was provided on the development of logging plans for the Murray Valley pine plantation situated within the Lane Poole Reserve. Monitoring of the visual resource management field trials previously initiated in the Southern Forest Region was also carried out.

Advice to Government Planning and Enquiry Groups

Advice and resource data was provided to the following Government and enquiry groups:

- . A comprehensive submission to the Resource Assessment Commission from the Government of Western Australia for the Inquiry into Forest and Timber Resources. The submission provided details of the State's forest management objectives and procedures, and placed these in their historical, biological, economical and social context;
- . Assistance in the early steps towards the creation of the National Forest Inventory. This included advice on the principles of the Inventory, its contents and administrative arrangements;
- . Statistical returns to the Australian Forestry Council;
- . Provision of information in response to parliamentary questions and enquiries from the public, timber industry and other Government agencies;
- . The Department was a principal coordinator in the development of a Discussion Paper on the review of National Forest Policy for the Standing Committee on Forestry (SCF) for the Australian Forestry Council. This paper has been submitted by the SCF to the Resource Assessment Commission inquiry into Forest and Timber Resources.

Research

The significant accomplishments of each research program relevant to Forest Resources Management are summarised below:

Entomology Program

Experimental fires near Collie in Autumn 1989 scorched an average of about half of each jarrah crown and reduced the density of jarrah Leafminer by one third. These preliminary results offer promise of a successful, practical method of controlling Leafminer outbreaks.

A survey in Collie and Manjimup Districts of adjacent stands of jarrah forest differing in time since Spring burning showed that Spring burning in 1988 did not favour Leafminer.

Surveys of jarrah stands throughout the northern jarrah forest resulted in the discovery of an extensive incursion of Leafminer from the Swan Coastal Plain into the Darling Range between Mundaring and the Avon Valley.

Extensive sampling of Gumleaf Skeletonizer in the southern jarrah forest has shown a contraction in distribution and decline in abundance. Most mortality of caterpillars resulted from parasitism by the wasp *Euplectrus* sp.

Studies of *Cardiaspina brunnea*, the Lerp infesting Flat-topped Yate, show that it has 3 generations per year and that its biology is comparable to that of *C. albitextura*, a well studied Eastern States species.

The newly constructed Insectary at the Manjimup Research Centre was commissioned in June 1990.

The release of introduced biocontrol agents of Ips was completed in cooperation with Kirup District staff.

A scientific paper was presented at an International conference on population dynamics of forest insects held at Heriot-Watt University, Edinburgh, Scotland in September 1989.

Native Forest Silviculture Program

A second summer of water stress and leaf area data have been collected from trees on the Inglehope thinning trial. In combination with CSIRO nutrient cycling data, production of a growth response model for thinned and fertilised jarrah trees can now be attempted.

The high rainfall zone water catchment treatment program was completed; Hansen's catchment was thinned to a prescribed uniform basal area, and Jones catchment was thinned according to a variable schedule reflecting regeneration, silvicultural and disease status. Two dieback infected catchments (Warrens and Bennetts) have been mined and will be monitored to assess the effect of intensive rehabilitation on catchment water yield, dieback development and regeneration survival.

In the karri forest two major thinning experiments were remeasured, and the initial measurement and establishment of a major thinning and fertilisation experiment was completed. Surveys of karri regrowth coupes for the incidence of brown wood and associated rots were conducted.

Plant Diseases Program

A Research Scientist and Technical Assistant have been employed at the Manjimup Research Centre to undertake research on the plant diseases in the South Coast and Southern Forest regions.

Potential improvements to the *P. cinnamomi* hazard rating systems for the high rainfall zone of the northern jarrah forest are being evaluated. Plant indicators are being grouped according to position in the landscape in order to facilitate prediction of hazard.

The superiority of jarrah lines resistant to *P. cinnamomi* has been maintained in field trials. The jarrah provenance screening program is well under way with a further 96 families being tested in the 1989-90 season.

Assessment of lesion extension of *P. cinnamomi* in stems of jarrah has commenced in stands thinned to different densities in the low, intermediate and high rainfall zones of the jarrah forest. Inoculation and measurement of growth rates is continuing.

From mid May 1989 to mid April 1990, 319 cultures were forwarded to the detection service for identification. Sixty four of these were *Phytophthora* species all of which were identified to species level and added to the database.

Plantation Silviculture Program

The phenomenon of drought death had been a recurrent problem in traditional plantation forestry in WA, especially in the Blackwood Valley. This phenomenon was subject to detailed study for the first time during 1989, following extensive deaths in 1987/88. The major factors found to influence drought death were tree stocking, soil depth, landscape position, and aspect. A model that predicts

which sites are susceptible to drought, based on these factors, was developed and presented for management application.

A major review of research into vegetation strategies to control salinity has been published (Schofield et al. 1989). This review incorporates several years work undertaken in the previous Rehabilitation Program, much of which was done in collaboration with other agencies. The review was timely since it had recently been concluded that tree water use, a focus of research for the past decade, was less important than tree commercial potential as a criterion for selection of tree species for reforestation. This result, along with the development of the sharefarming concept, gave rise to the initiative to establish a major short-rotation eucalypt pulpwood industry based on farmland.

Eucalyptus globulus has been identified as the main hardwood species for the development of a timber resource on cleared farmland. In 1989 large breeding population trials including 51 000 pedigree seedlings planted over 56 ha were established. Along with earlier work these trials have been incorporated into a WA Breeding Cooperative to coordinate the *E. globulus* breeding work of Bunnings Tree Farms, Alcoa and CALM. Thirty superior trees from earlier breeding populations at Busselton, Manjimup and Dwellingup were used to produce grafted seedlings for seed orchards. It has been estimated that seed from these orchards will increase yields by 40%.

Three projects supported by National Afforestation Program funds of \$1.5 million were designed to determine and demonstrate the multiple benefits of tree crops in farming systems. These projects have developed and demonstrated silvicultural practices for the short-rotation eucalypts and techniques by which pulpwood crops can make an optimum contribution to farm planning. A variation on the sharefarming concept called 'timberbelt sharefarming' was developed to make tree crops attractive to mainstream farmers. Timberbelts are planted in distributions designed to complement conventional farming practices. The long period of research into agroforestry systems under the previous Rehabilitation Program greatly facilitated the development of the timberbelt concept. Substantial interest in timberbelts has been generated. More than 1 000 ha are due to be planted in winter 1990.

Wood Utilisation Program

A log stockpiling trial showed that where storage requirements were limited, a low pressure watering system could be as effective as the higher cost high pressure systems in maintaining log quality.

Sawmilling trials of regrowth jarrah, karri and marri to produce structural timber and boards were continued, while Eastern States eucalypts such as Tasmanian blue gum and rose gum were assessed.

Drying research continued to determine efficient schedules for drying timber from green to fibre saturation point (the moisture content when cell walls start to dry and shrinking commences). Schedules for the CALM drying system were also researched. Trials of ultrasonic methods for determining moisture content were commenced at Harvey.

A major part of the research was assessing different adhesives for VALWOOD® production, and the gluing behaviour of different regrowth eucalypts species.

Successful field days on timber drying at the Wood Utilisation Research Centre, Harvey, resulted in research findings being taken up by industry and put into commercial practice. Wood Utilisation staff delivered lectures to students in the TAFE Certificate of Timber Technology and WA Forest Industries Training Committee trainees. Five WURC Reports were published during the year and eleven Technical Reports for limited distribution were prepared.

Publications

During 1989/90, 24 papers were approved. In addition, 32 papers and reports were published by Research Division staff during the year. Most of these appeared in journals published by

organisations independent of CALM; this helps ensure that the research done receives national and international exposure, thereby maintaining the high scientific profile enjoyed by CALM. For details of publications see Appendix 14.

Forest Inventory Research

As part of the karri growth modelling project a site quality definition system was completed for regrowth stands. This is based on site index curves. The development of yield tables is being extended to make these applicable to the wide range of potential management regimes.

Research work into field assessment and survey designs has been consolidated during the last year whilst the officer involved with this work (P Biggs) is writing up the Jarrah Inventory Project during his study leave. Mr Biggs and staff from Land Information Branch were awarded the prestigious President's Award of first prize for practical papers by the American Society for Photogrammetry and Remote Sensing for their research and development in the Jarrah Inventory Project.

A growth model allowing the prediction of growth and yield for *E. globulus* forests growing on ex-farmland and ex-forest sites has been developed to cover the range of conditions expected from Walpole to Perth.

Work has commenced with the CSIRO to evaluate the potential for remote sensing for pests and dieback disease using an airborne scanner in coastal vegetation and forest areas. These techniques are promising and may lead to cost efficiencies in future mapping programs.

Development was undertaken to introduce the South Australian Current Equivalent Growth system for early monitoring of establishment and tree growth into management of pine sharefarming undertaken by CALM.

Management

Timber Strategy

A timber strategy for the State entitled "Timber Production in Western Australia" and Regional Management Plans for the three Forest Regions were adopted by the Government in February 1988. Together the documents provided a blue print for the State's forestry operations based on a commitment to manage the forest on a sustained yield basis, to increase its productivity, to increase the value added component of timber processing and to improve utilisation. At the same time there was a commitment to provide security for forest areas reserved for conservation and the timber resource on which the timber industry is based.

Resultant changes to land tenure are reported in detail in the Land Estate section of this report.

During 1989/90 there were a number of major steps in the implementation of the Timber Strategy.

Thirteen Contracts to Supply were finalised, resulting in the almost complete transference of employment of the independent logging companies from sawmillers to CALM.

One tender has been let for the commercial thinning of young (20-25 year old) regrowth karri. This very early thinning using modern harvesting machinery not only produces some 75 cubic metres per hectare of chiplogs and sawlogs, but will also permit an acceleration of the production of large volumes of high quality sawlogs in future years.

Thirteen tenders for sale were finalised for specific quantities of a range of log products. One such tender included 15 000 tonnes per annum of jarrah domestic firewood in the Northern Forest Region. Another was for 15 000 cubic metres per annum of speciality hardwood logs including premium grade sawlogs, sheoak sawlogs, and small jarrah sawlogs. The 13 tenders have resulted in 64

additional Contracts of Sale between CALM and various log buyers. The total number of current Contracts of Sale is now over 200. These changes to wood allocation procedures will ensure significant improvements in the utilisation of the forest resource.

A major review of all royalties and stumpages was approved by the Minister, effective from 1 January 1990. The review resulted in substantial increases in royalties of the higher value log products such as premium grade sawlogs, but a modest increase only in royalties of lower grade sawlog products. This will give greater incentive to sawmillers to utilise lower grade sawlogs.

The royalty for residue products was increased to more realistically reflect the value of such products.

The Woodchipping Industry Agreement was extended to 31 December 1998 subject to changed conditions including increases in chipwood royalties and the establishment of a tree planting fund to establish trees on cleared agricultural land.

The revised royalties were based in part on the results of the several tenders for sale of logs conducted over the previous three years. A departmental briefing paper was produced which set out how royalty levels are determined.

Investment in new or upgraded milling facilities, as a result of the "Timber Strategy", continued in 1989/90. Whittakers' new Greenbushes Mill is due to be commissioned in September 1990, and Pinetec have commenced relocating and upgrading their mill in the metropolitan area.

A new medium density (MDF) fireboard plant to process pine thinnings from plantations established north of Perth is nearing completion.

Operational Planning and Control

Harvesting of native forests is directed by a silvicultural goal, and trees are retained in order to meeting long-term wildlife, landscape and production needs. Where harvesting does not effectively achieve the silvicultural purpose, a stand improvement operation is required. This involves the thinning of unwanted trees from over-crowded stands, and the removal of large dying trees (culls) to provide growing space for young faster growing trees.

The regeneration of cut-over stands is of paramount importance in achieving sustainable production.

All log harvesting activity was managed in accordance with a "Code of Logging Practice", a "Manual of Hardwood Logging Specifications" (for hardwood operations) and a "Pine Management Guide" (for softwood operations). Each document is regularly reviewed and updated to ensure all harvesting activity is carried out in the most efficient and environmentally sensitive way possible.

The Pine Management Guide document has been revised to reflect a number of silvicultural initiatives:

- . In order to minimise the commitment to prune in the future in non-drought prone areas, non-commercial culling has been stopped. This initiative is possible since first commercial thinnings are now on schedule.
- . The number of trees that are to be left after first commercial thinning in the Sunlands pine plantations have been increased to minimise possible wind damage.

The letting of major new logging contracts late in 1989 increased the contractors responsibilities and a programme of training contractor personnel was commenced by CALM. This is a new initiative intended to result in more efficient utilisation of the timber resource and CALM human resources in supervision of the logging operations.

The hardwood forest recording system (HOCS) has been revised to better reflect current silvicultural practices and to become a planning base for the management and protection of multiple-use native forests.

During 1989/90, work began on the development of a computer-based Forest Operations Control and Information System (FOCIS) which is designed to assist in both silvicultural planning and financial management of both softwood and hardwood plantations.

As the Department is now planting trees over a far greater range of sites throughout the State it has also initiated a programme for early growth monitoring in all new plantations. This will provide early feedback to management on the success of establishment, and on the need for follow-up treatments to meet growth and economic return targets.

Ips

Following the 1987/88 drought a major initiative to introduce biological control of *Ips grandicollis* was undertaken as Ips are recognised as being a factor contributing to the death of trees when put under stress by drought conditions. It appears from the initial follow-up survey work, that two parasitoids, *Dendrosoter sulcatus* and *Roptrocerus xylophagorum*, have been successfully established. Unfortunately it appears as though the introduction of the predator bark beetles was not successful.

Sirex Wood Wasp

Although Sirex Wood Wasp is not known to be established in Western Australia, a Sirex action plan has been developed. This plan aims at early detection of the insect and immediate action to minimise the impact of the insect once established. In addition Sirex trap tree plots have been established to aid in early detection. To assist people in the industry and the public to recognise this serious pine forest pest a brochure entitled "Recognise Sirex Wood Wasp in WA" has been produced.

Insects In New Plantations

During 1989 severe attacks from insects were experienced both in the hardwood and softwood plantations. In particular budworm (*Heliothis punctigera*) caused serious damage to pine seedlings which necessitated the replanting of 300 ha.

The impacts of insects on plantations established on ex-agricultural land is currently being assessed together with possible methods of control, their efficacy and possible effects on the environment.

Regeneration and tending of hardwood forest

Areas Cut-over and Regenerated	Northern Forest Region	Central Forest Region	Southern Forest Region	1989 Total Ha	1988
Jarrah					
- selection cut and regen	2 950	7 470	4 100	14 520	21 888
- cleared for mining	380	140		520	676
- cleared other		90		90	834
Jarrah/Wandoo					
- selection cut and regen	200			200	492
Karri					
- clear felled or cut to seed tree, regeneration commenced			1 510	1 510	1 180
- seed tree removal and regeneration commenced *			490	490	990
- thinned regrowth			910	910	750
- thinned old growth					88
Mallet					
- thinned	140			140	104
F.I.R.S.	500	10		510	765
Jarrah Stand Improvement	1 460	1 420	1 250	4 130	5 131
Wandoo Stand Improvement	780			780	1 326
Karri Regeneration completed					
- natural seed fall			520	510	800
- hand planting			680	680	645
- sown with seed			30	30	
Tuart Regeneration					38

* The areas for which seed trees are removed are the same areas accounted for under "Cut to seed tree" either in this or a previous reporting period. These are not additional areas of cutting.

The area cut-over and regenerated depends on the type of forest being harvested to provide the quantity of logs committed under the terms of the Timber Strategy. See Appendices 1 and 2(a) for the long term trend in areas of regeneration following cutting in the karri forest.

The Forest Improvement and Rehabilitation Scheme (FIRS), which is funded by ALCOA, aims to rehabilitate areas of jarrah forest adjacent to bauxite mining areas to increase the capacity of the land to support long-term land uses and to minimise the effects of dieback.

Jarrah and Wandoo Stand Improvement (JSI) are silvicultural programs to increase the sustained productivity of hardwood forests. The work involves the thinning of regrowth stands and the preparation of sites for regeneration.

Harvesting of low grade logs, charcoal logs and VALWOOD® sawlogs has effectively reduced the cost of jarrah stand improvement work.

Broadscale selective logging of the wandoo forest has virtually ceased. Logging has been confined to silviculturally based harvesting and regeneration treatments.

Establishment and Tending of Pine Forests

At 31 December 1989 the areas of State owned pine forests were 39 062 ha of *Pinus radiata*, and 29 346 ha of *Pinus pinaster* and other species, totalling 68 408 ha. This includes 2 741 ha of radiata pine planted on private property under a Softwood Sharefarming Scheme.

For the calendar year 1989 planting details were as follows:

	1988 *	1989
	(ha)	(ha)
P. Radiata	2 373	1 622
P. Pinaster and other species	183	92
Total	2 556	1 714

* Figures as reported in 1989 report. The revised figures after some areas failed and others were re-mapped are 2 235 ha radiata and 183 ha pinaster, totalling 2,418 ha.

The areas planted in Winter 1989 with pine species are shown below for each District.

Districts planting pines

District	Radiata	Pinaster and Other Species	Total
Wanneroo		40	40
Mundaring	21		21
Harvey	134	4	138
Collie	146		146
Kirup	338		338
Busselton	10	47	57
Nannup	470		470
Manjimup	218		218
Pemberton	47		47
Walpole	144		144
Albany	94		94
Total	1 622	91	1 713

The above figures include second rotation planting as follows:

Radiata : Mundaring 21 ha, Harvey 134 ha, Kirup 115 ha, Nannup 183 ha
 Pinaster : Wanneroo 23 ha, Harvey 4 ha

The longer term trend in pine planting is shown in Appendix 3.

The following pine forest tending was carried out during 1989/90:

Prior to Planting	- Clearing	625 ha
	Scrub Control	23 ha
	Ripping	255 ha
	Ploughing	100 ha
	Furrowlining/Mounding	466 ha
	Weed Control	1 664 ha
	Roading	153 km
Post Planting	- Weed control	2 847 ha
	Scrub control	588 ha
	Insect control	700 ha
	Wildling control	99 ha
	Fertilising	1 383 ha
	Low pruning	1 690 ha
	High pruning	2 472 ha
	Non commercial thinning	20 ha
	Firebreak maintenance	1 149 km

The following is a summary of pine plantation thinning and clearfelling for 1989/90:

Operation	Northern Forest Region	Central Forest Region	Southern Forest Region	Total ha
Thinned	789	1 953	84	2 826
Clearfelled:				
- mature stands	86	426	4	516
- Xmas trees	20	-	-	20
- damaged stands *	130	71	-	201

* Damage to stands resulting in early clearfell or salvage from fire and windthrow.

A severe wildfire in January 1990 killed about 130 ha of *P. pinaster* in the Wanneroo plantation. All the commercial timber within this 17 year old stand was salvaged.

An area in the Busselton District was severely damaged by gale-force winds and was salvaged and will be replanted.

Establishment and Tending of *Eucalyptus globulus* Forest

The following operations were carried out during 1989/90 on *E. globulus* forest established under sharefarm agreements between CALM and private property owners.

Operation	Area (ha)
Ploughing	61
Ripping	142
Mounding	251
Furrowlining	17
Infill planting	202
Fertilising	32
Grass control	814

During the winter of 1989 a total of 3 870 ha were planted under sharefarming agreements.

Appendix 2(b) provides trends in hardwood plantation areas.

Commercial Planting and Woodlots on Private Property

Private afforestation companies reported on the establishment of a further 1 670 ha of eucalypt plantation and 590 hectares of softwood plantation on private land during 1989. The total area of private plantations known to the Department as at 31 December 1989 is about 4 870 ha of eucalypt and 17 090 ha of softwood.

For eucalypt planting the increase in area over the previous year is as a result of an expanded program by Bunnings Tree Farms.

CALM carried out the following operations under contract to Bunnings Tree Farm:

Operation	<i>E. globulus</i> (ha)
Ripping	333
Mounding	42
Furrowlining	20
Fertilising	32
Grass control	357
Infill planting	1

Broadacre pine and eucalypt plantings were initiated in the Rocky Gully area for the first time.

In 1988 CALM successfully applied to the National Afforestation Program (administered by the Federal Department of Primary Industries and Energy) to fund a project called "The integration of short rotation eucalypts into agricultural systems in the south-west of Western Australia". The Department of Agriculture and the Water Authority of WA are partners in the project which was managed by CALM. A major objective is to demonstrate to farmers the benefits of pulpwood crops to farms and catchment values. In 1989, a total of 536 ha of eucalypts (mainly *E. globulus*) were planted on 78 farm locations which ranged from the dry eastern extreme at 500 mm rainfall to highly fertile sites in the 1 400 mm zone. Of the 536 ha a total 286 ha were part of the Hardwood Sharefarm Program and 250 ha were part of the Timberbelt Program.

Rehabilitation of Forests

During 1989/90 the following areas were rehabilitated to be compatible with the prescribed land use for the area. "Catchments" works were carried out on Water Authority of WA lands.

	Northern Forest Region	Central Forest Region	Southern Forest Region	Total ha
Bauxite Mining	381	86		467
Tin Mining		31		31
Coal Mining		77		77
Gravel Pits	4	15	13	32
Catchments	4	113		269
Other *		29	30	59

* Includes degraded land, roads and landings.

Log Production

The production of hardwood sawlogs in 1989/90 is summarised in the following table, and can be compared with the projected intake.

Hardwood Sawlog Production from Crown land 1989/90

(cubic metres)

Species	1st Grade		2nd and 3rd Grade		Regrowth Thinnings		Veneer Logs	Other	Total	
	Actual	Projected*	Actual	Projected*	Actual	Projected*			Actual	Projected*
Jarrah	442 582	459 000	80 985	68 000				317**	523 884	527 000
Karri	140 492	153 000	39 769	18 000	39 879	50 000	1 885		222 025	221 000
Marri ***	6 027	30 000	28 915		21		35		34 998	30 000
Wandoo	87		522						609	
Blackbutt	2 656		397						3 053	
Sheoak	185		16						201	
Other					22				22	
	592 029	642 000	150 604	86 000	39 922	50 000	1 920	317	784 792	778 000

* Projected intakes are the average for 1989 and 1990 as set out in the Timber Strategy, Tables 14, 15 and 17.
Note: no separate projected figure for minor species.

** Small jarrah sawlogs

*** During the period all marri sawlogs were incorporated into a single grade.

The actual production of first grade sawlogs was below the volume projected in the Timber Strategy for the period for each of the major species. On the other hand, the volume of second and third grade sawlogs actually produced, significantly exceeded the projected volumes for jarrah, karri and marri. These increases in the amount of lower grade logs sold are related to the development of the graduated royalty system which has encouraged sawmillers to economically process logs that would have been previously woodchipped or wasted.

**Log Production from Crown Land and Private Property
1989/90**

Type	Crown Land	Private Property	Total
	(m3)	(m3)	(m3)
Sawlog Timber *			
Jarrah	523 884	12 026	535 910
Karri	222 025	8 492	230 517
Marri	34 998	6 497	41 495
Blackbutt	3 053	726	3 779
Wandoo	609	933	1 542
Sheoak	201	0	201
Other	22	866	888
Total Hardwood	784 792	29 540	814 332
Pine	121 041	19 820	140 861
Total Sawlogs	905 833	49 360	955 193
Other Log Material **			
Hardwood	534 454	51 021	585 475
Softwood	191 479	86 045	277 524
Total Log Timber	1 631 766	186 426	1 818 192

* Sawlog timber from all sources, including veneer, but not including chiplogs, firewood, piles and poles.

** Includes hardwood chiplogs, pine industrial wood and pine rounds.

Compared with the previous year the volume of all log materials decreased 124 995 m³ to 1 818 192 m³, whilst pine logs increased by 43 109 m³ to 418 385 m³.

The major reasons for the variations was a reduction in demand for hardwood chiplogs and an increase in harvesting of pine logs from private property.

Longer term trends are shown in Appendices 4, 5 and 6.

**Sawn Production from Crown Land and Private Property
1989/90**

	1987/88 (m3)	1988/89 (m3)	1989 (m3)*
Sawn Timber Production			
Crown Land	266 382	302 523	288 548
Private Property	27 279	17 991	16 680
Sawn Sleeper Production			
Crown Land	24 321	20 311	24 808
Private Property	670	2 080	2 170
Total	318 652	342 905	332 206

* Calendar year, January to December.

The provisional figures for 1988/89 published in the 1989 Annual Report have been revised to reflect the actual volumes produced by sawmillers and advised to the Department in returns.

Figures for 1989/90 are not yet available, therefore sawn production for 1989 calendar year is shown to indicate trends; final figures covering the period July 1989 to June 1990 will be published in the next report.

Veneer Log Production

	1988/89 (m3)	1989/90 (m3)
Karri	2 417	1 885
Marri		35
Pine	5 723	5 392
Total	8 140	7 312

The supply of high quality karri logs for production of veneer decreased by 532 cubic metres to 1 885 cubic metres.

Hardwood Chiplog Production from Crown Land and Private Property

	1988/89		1989/90		Variations with previous year
	(m3)	%	(m3)	%	
Crown Land					
Old Growth Forest		86.61		86.01	
Marri *	459 775	74.97	376 067	70.36	- 18.21%
Karri *	71 397	11.64	83 603	15.64	17.10%
Regrowth Forest (thinnings)		13.39		13.99	
Marri	4 214	0.69	5 161	0.97	22.47%
Karri	77 911	12.70	69 442	12.99	- 10.87%
Globulus			181	0.03	
Sub-total Crown Land	613 297	100	534 454	100	- 12.86%
Private Property					
Marri	80 829		45 632		- 43.55%
Karri	11 036		5 389		- 51.17%
Sub-total Private Property	91 865		51 021		
Total C.L. & P.P.	705 162		585 475		- 16.97%

* includes forest residue.

The supply of marri, karri and globulus chiplogs from Crown land decreased by 78 843 cubic metres (12.9%) to 534 454 cubic metres.

There was a continued trend in a relative decline of chiplogs from 'old growth' Crown land forest. In 1989/90 approximately 86.0 percent came from this type of forest and 14.0 percent from regrowth forest thinnings (86.6% and 13.4% respectively in 1988/89).

The Diamond Mill also obtained 51 021 cubic metres of chiplogs from private property; a decrease of 40 844 cubic metres from 1988/89. Sawmill residues contributed 78 150 tonnes to woodchip production.

Longer term trends for hardwood chiplog production are shown in Appendix 6.

Sandalwood Production 1989/90

	1988/89 tonnes	1989/90 tonnes
From Crown Land		
Green Sandalwood	768	853
Dead Sandalwood	1 123	940
From Private Property	207	187
Total	2 098	1 980

Production included 32 tonnes by pastoralists under hardship provisions and 42 tonnes of dead wood salvage and chips.

Licences to obtain sandalwood were issued to 29 contractors (11 full-time, 7 part-time, 3 pastoralists and 8 private property).

Exports for 1989/90 totalled 1960 tonnes, which is the same as in 1988/89.

**Firewood Production and Consumption
1989/90**

Log Source	Type	1988/89	1989/90
		(tonnes)	(tonnes)
Firewood contractors	Local firewood permit	174	
	Contracts of Sale	5 518	24 343
	Forest Produce Licences	14 146	6 894
Industrial use	Charcoal logs	2 056	33 834
Total Log Residue		21 894	65 071

Mill Source	Type	1988/89	1989/90
		(tonnes)	(tonnes)
Crown land sawmills	For sale	90 373	59 529*
	For own use	5 282	5 658
Private Property sawmills	For sale	2 156	930
	For own use	145	81
Total Mill Residue		97 956	66 198*

* July-December 1989 figures only, January-June data not yet available. Sawmill figures for 6 months July-December 1988 published in the 1988/89 Annual Report have been updated to include January to June 1989 amounts.

Above data includes solid wood, sawdust, shavings, chips and edgings sold as fuel and for own use.

Firewood is obtained as a by-product of sawmilling, from forest thinning operations, and logs from dead trees. These figures do not take into account the private collection of firewood from the forest by members of the public for their own use.

A silicon smelter commenced full scale operations during the period. The operations of the smelter provided a valuable market for forest residue material.

A number of tenders were held which resulted in longer term secure contracts with firewood operators to supply firewood to the metropolitan area.

These initiatives together contribute to a 300% increase in the utilisation of jarrah residues.

Other Forest Produce 1989/90

			1988/89	1989/90
South West Land Division				
Agricultural Areas				
Mining timber	(m3)	Crown land	1 336	666
		Private property	N/A	N/A
Piles, poles and bridge timbers	(m)	Crown land:		
		Hardwood	97 977	214 987
		Softwood	8 562	15 440
		Private Property	7 078	3 219
Fence posts and rails	(nos.)	Crown land	149 988	124 136
		Private property	18 095	21 244
General fencing material	(tonnes)	Crown land	775	5 142
		(Contracts of Sale)		
Strainer posts	(nos.)	Crown land	6 107	6 710
		Private property	N/A	N/A
Goldfields Area				
Mining timber	(tonnes)	Crown land	1 365	974
Fence posts and rails	(nos.)	Crown land	7 991	6 465
Stainer posts	(nos.)	Crown land	743	780

Mining timber production in the Goldfields decreased by 391 tonnes to 974 tonnes.

Thinning operations in the mallet forest at Narrogin yielded 47 790 pieces of fence post material and 467 tonnes for tool handles.

The updated summary of exports and imports of forest produce, taken from the figures supplied by the Australian Bureau of Statistics, are shown in Appendices 7 and 8.

Forest Offences

Three offenders were prosecuted for illegal removal of forest produce. Fines totalling \$1,200.00 were imposed.

Three offenders were prosecuted for various breaches of the Forest Disease Regulations, resulting in fines totalling \$600.00 being imposed. Two of these offenders were also convicted of supplying false information to a Forest Officer, resulting in further fines totalling \$150.00

Tree Nurseries

The third stage of the nursery rationalisation occurred in 1989/90 with consolidation of the Genetics and Tree Improvement Group, Seed Centre and Nursery management and staff at the west Manjimup nursery.

At west Manjimup, the building of the new seed store and laboratory was completed. These facilities combined with the nursery, seed and tree breeding functions, is now called the Plant Propagation Centre (PPC).

Public education and information programs were provided at the PPC to some 68 interested groups from local and overseas industrial and private associations.

Seed orchards and seed production areas of various species including pine, karri, marri and bluegum were maintained during the year. Clonal archives for *E. globulus* were initiated.

The pine nursery site was developed at the PPC for 1990/91 production.

Broome and Narrogin nurseries, primarily commercial nurseries, continued to grow plants suitable for rural revegetation, roadside and mine rehabilitation, community projects and amenity purposes.

Pine seedlings were grown at Gnangara nursery, with 14% produced for private sale, and the bulk for CALM's plantation and pine sharefarm program.

Departmental Nursery Production 1989/90

Plant Type	Nursery	For Public Sale	For Dept. Use	Total
Container Stock				
Mixed species	Narrogin	372 000	36 000	408 000
Mixed species	Manjimup	100 000	1 000 000	1 100 000
Karri			2 500 000	2 500 000
Jarrah and Marri			200 000	200 000
Bluegum		3 000 000	500 000	3 500 000
N.A.P. Research			1 500 000	1 500 000
Mixed species	Broome	26 222 (free) 21 210 (sale)	2 000	26 222 21 420
Open Rooted Stock				
Pine (ex seed)	Manjimup		250 000	250 000
Pine (ex seed)	Gnangara	450 000	2 700 000	3 150 000
Pine (cuttings)			100 000	100 000

Seed Handling

Seeds of the principal species needed for departmental forest and sharefarm plantings, rehabilitation and conservation projects, as well as for public sales were acquired, processed and stored at the new Plant Propagation Centre at west Manjimup.

The total volume of seed acquired was 413 kg, whilst about 476 kg of seed was disbursed for CALM projects.

The PPC (Seed Centre) sold 38 kg of seed from over 180 different species to local nurseries and overseas clients. Sales of seed grossed \$21 700.

A further two rare and endangered species were added to the PPC seed stock in store.

Performance Evaluation

Indicator:

The extent to which commercial exploitation of the forest is managed on a sustained yield basis and its productivity is increased.

Measures:

Adherence to the quantities projected in the publicly endorsed Timber Strategy - the hardwood 1st grade sawlog production from Crown land in 1989/90 did not exceed the projected cut of 642 000 cubic metres. The actual cut was 592 029 cubic metres. Hardwood 2nd and 3rd grade sawlogs are the by-products from the 1st grade sawlog operations. Due to the increased utilisation and sales of these low grade logs the actual production of 2nd and 3rd grade sawlogs exceeded the projected level by 64 604 cubic metres in spite of a lower production of 1st grade sawlogs.

The use of marri for sawlogs increased from 16 795 cubic metres to 34 942 cubic metres, thereby extending the hardwood sawlog base.

The use of small sawlogs to produce high grade products in the VALWOOD process was confirmed by entering into contracts for commercial production.

The sale of jarrah residue increased from approximately 22 000 tonnes to approximately 65 000 tonnes or almost 300%, due to the commencement of the silica project and long-term Contracts of Sale for firewood to supply the metropolitan area.

Indicator:

The extent to which the supply of logs to the industry is equitable according to capacity and has kept pace in quantity and quality with commitments.

Measures:

The supply of logs from CALM controlled lands using CALM contractors under Contracts to Supply increased to over 99% of total log sales by entering into a further 12 Contracts to Supply.

Tenders were called and contracts let for the sale of speciality hardwood logs specifically aimed to produce high grade value-added products, in particular the furniture industry.

A further 68 Contracts of Sale were entered into including all grades of sawlogs and residue products such as domestic firewood.

Indicator:

The extent to which the market has been tested for the maximum price payable for the product.

Measure:

Part of the timber resource is periodically placed, via tender, on the free market, so that there is an equal opportunity for all segments of the industry to obtain additional resource at a price that is determined by demand. The results of tenders have been used as part of the General Review of royalties undertaken in 1989.

Indicator:

The extent to which revenue exceeds service, re-establishment and growing costs.

Measures:

The costs of establishment and growing are recouped through log sales in the form of royalties and stumpages. A General Review was conducted in 1989 and continued the restructuring of royalties started in the 1986 review to ensure the revised targets will recoup the growing costs. Service costs are recouped through log sales in the form of other components of the log price contained in Contracts of Sale which include administration charges, in-forest charges, roading charges, log production and delivery charges.

The proportion of log sales under Contracts of Sale increased which will ensure service costs are recouped as part of the contract log price schedules. The various charges in the log price schedules were increased to recoup increased in-service costs.

SERVICES FOR THE COMMUNITY

Objective: To satisfy those demands on CALM lands, assets and skills that do not relate to CALM primary objectives.

The program includes:

- emergency assistance to landholders, particularly in fighting fires adjacent to lands managed by CALM;
- making CALM expertise available to the community;
- making CALM resources available to the community for a commercial fee where compatible with Government and CALM objectives;
- management of Government grants to non-Government conservation agencies and groups.

Emergency Services

A fire detection service was provided to landholders in the forest areas of the south west through the Department's aerial surveillance system.

The Department maintains representation on the Bush Fires Board and the State Counter Disaster Advisory Committee and provides fire suppression training sessions at courses held by the Bush Fires Board, State Emergency Service, the Australian Counter Disaster College and West Australian Fire Brigade.

During the year the Department hosted a number of international and interstate groups of fire controllers, researchers and senior administrators. These included four interstate fire managers in September.

CALM staff attended 54 fires on private properties adjacent to CALM estate, and provided assistance in their control.

Departmental staff participated in the preparation of the Kwinana Integrated Emergency Management System and the State Counter Disaster Marine Oil Pollution programs.

The Department maintains rescue equipment in the State's more remote and rugged national parks. Park rangers conducted one cliff rescue in Hamersley Range National Park.

Performance Evaluation:

Indicator:

(Fire emergencies): The extent to which community values on and near CALM lands are protected from wildfires.

Measure:

Fifty four wildfires on private property adjacent to CALM land burned 5 911 ha. Without CALM assistance the area burned would most likely be greatly increased.

Community Services

The Department's Planning Branch staff provided advice to Shires regarding the preparation of management plans for Shire bushland reserves.

Assistance was given to the Fisheries Department with the North-West Snapper tagging program from Coral Bay to North-West Cape.

CALM nurseries at Broome, Gnangara, Manjimup and Narrogin raised 862 000 seedlings for sale to the public for land conservation and landscaping purposes.

An additional 28 000 seedlings were issued free from Broome Nursery as a contribution to the Government's North West Tree Scheme. The Scheme is aimed at encouraging householders and landowners to use species, mainly native, that have a low water requirement and are suited to arid areas.

The Seed Centre, located at Manjimup, sold 38 kg of seed of 161 WA native species and 6 exotics. The majority of sales were to commercial nurseries.

Funds provided by Landcorp enabled 25 000 tree seedlings to be raised at Narrogin and distributed to schools throughout the South-west in support of Arbor Day.

The Department has also been involved in assisting other agencies with environmental protection matters, eg. and coordination of the production of the Rottnest Island Water Supply and Wastewater Disposal public environmental report on behalf of the Rottnest Island Authority; advisory work to monitor water quality of wetlands and establish vegetation on disturbed lands and tailings associated with the AMC mineral sands mine near Capel.

Recoupable Projects

CALM provided services to some industries and local government authorities on a cost recoupable basis, where CALM expertise was the most suited to provide the particular service.

In the Goldfields Region, CALM staff organised and supervised the annual sandalwood harvest on behalf of the Australian Sandalwood Company.

Goldfields staff also managed the Goldfields Dust Abatement Committee's activities on behalf of the Local Government Authority and the Chamber of Mines.

The Northern Forest Region undertook forest improvement operations of 452 hectares of jarrah forest adjacent to bauxite mining pits on behalf of Alcoa Australia Limited.

The Department provided a jarrah dieback interpretation and mapping service for Alcoa, and for BHP/Westralian Sands in Busselton District.

Metropolitan Region undertook operations on behalf of urban developers and Armadale City Council associated with the conservation of the endangered Purdie's donkey orchid. The Region also undertook midge control works at Lake Forrestdale on behalf of the Council.

Wellington Catchment Reforestation

Approximately 6 000 hectares has been replanted to date on the Wellington Catchment on behalf of the Water Authority of Western Australia. The area planted 1989/90 was 265 ha. This comprised 220 000 trees of the species *E. globulus*, *E. camaldulensis*, *E. wandoo*, *E. botryoides*.

Timber Industry Regulation and Employment

At 30 June 1990 a total of 106 mills were registered under the provisions of the Timber Industry Regulation Act: 44 mills receiving logs from Crown land, 34 mills receiving logs from both Crown land and private property and 28 mills receiving log supplies solely from private property. The average number of persons employed in all timber mills each month throughout the year was 1 915.

The district inspectors made 1 049 mill inspections and 701 bush inspections. There were 154 notifiable accidents during the period, one being fatal. A notifiable accident under Section 14 of the Timber Industry Regulation Act is comparable with a lost time accident as defined by Australian standard. The number of accidents is approximately 1.13 accidents per sawmill. This is equivalent to a frequency rate of approximately 25. (The frequency rate is calculated as the number of lost time accidents per 1 000 000 hours worked).

It is anticipated that in the near future the three District Inspectors will transfer to the Department of Occupational Health, Safety and Welfare (DOSHOWA). The position of Controlling Officer under the TIR Act, traditionally filled by a senior officer within CALM, will then be filled by a senior officer within DOSHOWA.

The cost of administering the Timber Industry Regulations Act for the year was as follows:

Salaries	106 220
Travel Allowances, plant costs and sundries	26 384
TOTAL	132 604

The overall employment in forest based industries for 1989/90 was estimated as follows:

Sawmilling employees, including bush workers, (employees of registered sawmills only)	*2 239
Other wood processing industries (includes employees 'working in wood' as defined under the Factories and Shops Act (1963)	3 000
Sandalwood workers	61
Apiarists (244 sites registered)	147
TOTAL	5 447

* Also includes firewood, mining timber and pole cutters working under licence or contract.

International Advisory Services

The Department continued its involvement in the Commonwealth funded Australian Centre for International Agricultural Research (ACIAR) project number 8613. The aim of this project is to develop fuelwood and sandalwood silvicultural practices in East Indonesia. The project has just completed its third year and is likely to be extended for at least one further year. Funding for the whole project was \$376 850 (\$Aust) and for 1989/90 \$134 009.

A series of field trials of multi-purpose trees have been established in a range of climatic and soil types in West Timor.

Part of the research on sandalwood has been subcontracted out to Curtin University. A start has been made on the establishment of international sandalwood species trials at Kununurra, New Caledonia, Vanuatu and Fiji.

Assistance to Nature Conservation Projects

Financial assistance was provided to Greening Australia (WA) Inc and the Department was represented on its Board of Directors.

Materials for the construction of two and a half kilometres of fence was distributed free to private landowners for the protection of declared rare flora.

The Department made financial grants totalling \$175 000 to five outside bodies working on conservation projects.

CORPORATE SERVICES PROGRAM

Objective: To provide efficient and effective services to support CALM programs.

The program includes:

- . management of human resources safety, finance, information technology, the library and other corporate information resources, plant, stores and equipment, and radio communications;
- . administration of tenure related functions of the public lands and reserved waters entrusted to CALM - see the section of this report on The Estate of Lands and Waters;
- . the functioning of the Corporate Executive.

Human Resources Management

Objectives:

- To recruit and maintain well motivated and competent staff;
- To provide programs for staff health, safety, development and training.

Staff

The approved staff establishment figure for the Department as at 30 June 1990, expressed in full-time equivalents, was 1,454.31.

The number of personnel employed as at 30 June 1990, expressed in full-time equivalents, was 1,437.8. This was made up of the following categories:

. Public Service Act	517.64
. CALM Act	358.93
. National Park Rangers	91.00
. Wages	470.23

During the year the following salaried staff movements occurred:

- 81	new appointments
- 23	appointments made permanent
- 4	retirements
- 26	resignations
- 16	cessations
- 19	reclassifications
- 49	promotions

As an outcome of the 4 percent Productivity Agreement in 1987 the Government required the backlog of accrued long service leave for salaried officers to be cleared by December 1990. At that time there were 77 officer-years of accrued leave involved. As at 30 June 1990 this had been reduced to 24 officer-years. The clearing of this backlog, with the resulting absence of available staff, has created additional pressures on departmental operations during 1989/90.

An Aboriginal Employment and Training Coordinator was appointed in January 1990, on an initial 12 months term appointment. Her employment has assisted a number of strategies contained in the Aboriginal Employment and Training Plan to be more speedily progressed.

Industrial Relations

The decision of the Australian Industrial Relations Commission in the National Wage Case decision of August 1989, to grant two pay increases not less than six months apart, subject to certain award-specific restructuring outcomes, set the scene for the industrial relations activities in the Department during 1989/90.

Consultative committees with representatives from unions, management and employees have been established to consider structural efficiency issues relating to occupational groups covered by the Civil Service Association, the Australian Workers' Union, the Miscellaneous Workers' Union and the Federation of Air Pilots. Initiatives being discussed include job analysis, improved performance appraisal, multiskilling, training, career paths, restructuring of awards and productivity.

A career development model designed for wages employees has been ratified by the Australian Industrial Relations Commission and accounted for a substantial proportion of the package approved by the Commission for the second stage wage increase. As well as reducing over 100 wages classifications to 7 broadbanded skill levels, the career development model will encourage and facilitate multiskilling and flexibility. Individual employees will no longer be identified by specific classifications which involve narrow work organisation methods and demarcation of duties; instead, employees will be identifiable by their levels of knowledge, skills, experience and responsibility. This will require a different approach to defining classifications from that which applies under the existing award.

Awards covered by the Civil Service Association have also been granted both increments and discussions are continuing on unresolved issues and outstanding award amendments that are required.

Negotiations are continuing in order to develop an agreed package of restructuring issues for the occupational groups covered by the Miscellaneous Workers' Union and the Australian Federation of Air Pilots, before an application can be filed for the second pay increment.

Training and Development

The performance management system is now developed to the stage that it is relevant to most job families within the Department, allowing for clear identification of the need for training. Careful planning and budgeting for attendance at training courses is carried out, ensuring equitable access to training for improved performance or for career development.

A revision of the Certificate of Conservation and Land Management, conducted by the Technical and Further Education (TAFE) centre at Bunbury, was completed. This course is now registered with the Australian Council for Tertiary Awards in Canberra.

A system of accreditation for departmental inservice training courses has been introduced to ensure uniform standards in the preparation, delivery and evaluation of all training programs. The accreditation process ensures training courses are delivered in the most effective and efficient way. Training in the principles and procedures of training has been provided to key departmental trainers to ensure a consistent and professional approach in the way in which training is carried out.

New training courses continue to be developed as changes in technology and departmental objectives occur. This year new courses developed and delivered include: Principles and Procedures for Training; Safety Coordinators Training and Volunteer Coordinators Training.

The award restructuring process has given greater emphasis to skill formulation. Consultative mechanisms with appropriate unions and representatives are being established throughout CALM to facilitate this process.

Field Cadets

Ten cadets who successfully completed their two years of training in December 1989 received their Certificate of Conservation and Land Management at a graduation ceremony held on 6 April 1990. The ceremony was held at the Lord Forrest Hotel in Bunbury and the Certificates were presented by the Hon Bob Pearce, Minister for the Environment. Of the ten graduates:

- . six were appointed as Forest Rangers in January 1990. Two of these were posted to the Northern Forest Region, three to the Central Forest Region and one to the Southern Forest Region;
- . one was appointed as a Trainee Wildlife Officer in January 1990 and posted to the Wildlife Protection Branch in the metropolitan area;
- . one was appointed as a National Park Ranger in January 1990 and posted to the Northern Forest Region;
- . one was appointed as a Field Officer with Bunnings Tree Farms who financed his training for the two year course;
- . one did not take up an appointment.

The Keynes Memorial Prize was awarded to Luke Coney and the Executive Director's prize to Grant Pronk.

Fourteen cadets successfully completed the first year of their training at the South-West College of TAFE, Bunbury, in November 1989. They and the Executive Director's Scholarship Awardee commenced the second year of the course at the Dwellingup Cadet Training Centre in January 1990.

The second year syllabus is under continuous review. Traditional working periods at pine districts continue to provide opportunities for cadets to witness and participate in activities necessary for their development, as do the opportunities provided by the work experience with the wildlife officers and the 'camps' in the Southern Forest Region.

A new group of fifteen first year cadets selected from 210 applicants commenced the course at the South-West College of TAFE in Bunbury 1990.

Workers' Compensation

The introduction of an "active case management program" has seen the annual workers' compensation insurance premium reduce from \$1.373 million in 1988/89 to \$1.205 million for 1989/90. New claims for the same periods totalled 256 and 252 respectively.

Proposed amendments to the Workers' Compensation and Assistance Act will place a far greater emphasis on rehabilitation than in the past and performance in this area will be detailed in future annual reports.

Occupational Health, Safety and Welfare

The introduction of the Occupational Health, Safety and Welfare Act has led to the organisation of a number of Health and Safety Committees throughout the Department.

The Worksafe course introduced in 1988 has now been extended to all personnel and is being used to form part of the basic health and safety training within the Department.

A large number of District and specialist groups participated in the Industrial Foundation for Accident Prevention/FAI Insurance Safe Way Awards. A number of private enterprise companies

throughout the State also participate. For the second successive year the Department achieved the second highest number of successful units in this award.

A new accredited training package has been developed for District Safety Officers. Twenty District Safety Officers attended the first of these new 4-day courses in May 1990.

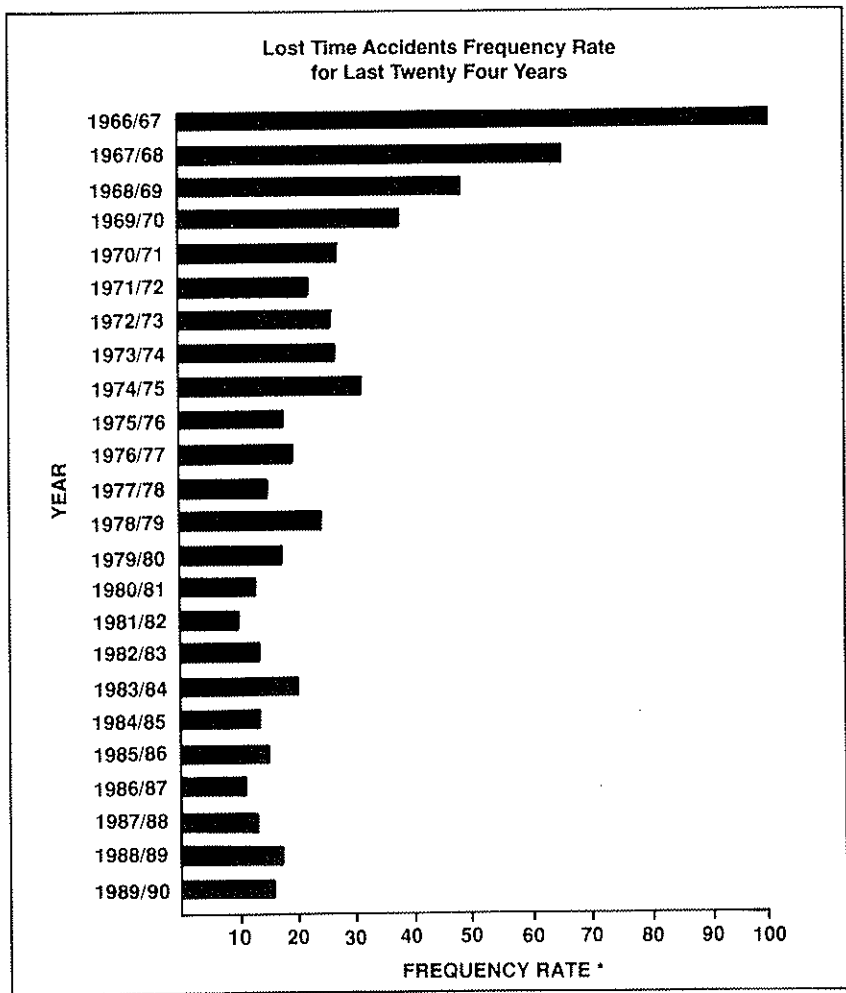
Officers from the Health and Safety Section assisted IFAP with audit inspections of a number of private companies and have also accepted invitations to give lectures on occupational health and safety to both private and Government agencies.

Other health and safety activities during the year included:

- 16 three-day schools for 189 St John's First Aid Attendants
- 71 personnel trained at two-day Worksafe schools
- 12 District personnel attended a two-day chemical school
- 1 person was awarded membership of the Intactives Club. His foot was saved from serious injury by wearing safety footwear.

The all injury frequency rate has decreased from 69 to 63.

Details are shown in Appendix 13.



* Calculated by number of lost time accidents per 1000 000 hours worked.

Performance Evaluation

Indicator:

The extent to which CALM has a competent workforce.

Measure:

The number of satisfactory performance appraisals versus the number of unsatisfactory performance appraisals - 486:2.

Indicator:

The extent to which staff are retained.

Measure:

Separation rate versus number of salaried positions - 46:876.

Indicator:

The extent to which industrial relations disputes are avoided.

Measure:

The number of industrial disputes - 1.

Indicator:

The extent to which CALM personnel sustain Medical Treatment or Lost Time Injury Accidents.

Measure:

Safety statistics: all injury frequency rate - 63; duration rate - 14.

Indicator:

The extent to which appropriate training programs are developed to meet changing technology and procedures.

Measure:

Number of new courses developed or existing courses modified to meet changing needs - 6 new, 2 modified.

Indicator:

The extent to which sufficient access to training programs is provided to all employees.

Measure:

Number of employees who have had their nomination to attend a training program refused - Information not yet available.

Indicator:

The extent to which employees are prepared to meet ongoing and differing challenges in a competent and highly motivated way.

Measure:

Employee performance is reflected in performance appraisal - 2 unsatisfactory performance appraisals.

Indicator:

The extent to which graduates of the cadet training school are capable of carrying out the duties of junior field officers.

Measure:

Graduates are deemed capable on permanent appointment. A performance appraisal is conducted to determine permanency - 8 graduates were permanently appointed in 1989/90.

Efficiency Indicators:

The salary budget for officers in the staff section (\$108 000) divided by the number of transactions dealing with:

higher duties	555
advertised vacancies	106
review of positions (creation, reclassification, abolition)	158
salary increments	456

leave entitlements	<u>4 090</u>
Total	5 365

= \$20.13 per transaction.

The salary budget for officers in the Staff Section (\$108 000) divided by the number of staff (876) = \$123.29 per salaried staff member.

The number of hours worked (2 393 040) in relation to the number of hours lost due to industrial stoppages - (nil).

The Training and Development cost centre budget and salaries (\$116 000) divided by the number of training programs - (80) = \$2 450 per program.

Workload Indicators:

Personnel:

The number of -

leave applications processed	4 090
salary variations initiated	1 182
advertised vacancies	106
positions reviewed	158

Industrial:

The number of -

compulsory conferences	2
hearings attended	3
field visits	5

Safety:

The number of personnel attending safety training courses for -

first aid	189
worksafe	71
chemical use	12
supervisors health and safety training	20

The number of field visits by departmental health and safety staff - 94.

Training and Development:

The number of courses conducted and their duration - 80 courses totalling 175 days.

The number of new courses developed - 6.

Major projects relating to the achievement of the section's goals carried out by section staff -

- . Performance Management System
- . Training and Development Manual
- . Review of Associate Diploma in Applied Science course (WACAE)
- . Progress with Career Development Model for employees under Australian Workers' Union Award.

Finance

Program Management

An extensive review of accounting and budgeting systems and procedures was undertaken to prepare for the introduction of budgets and reporting by programs for the 1990/91 financial year. This will include budgets for each program in the parliamentary estimates and the submission of annual financial statements for audit that show expenditure on each program.

Financial Systems

A new financial system was acquired by tender from Oracle Systems (Australia) Pty Ltd. The system includes modules for general ledger, accounts payable, purchasing, accounts receivable, fixed assets and inventory. Work is well advanced on implementation, which will be completed during the 1990/91 financial year.

Financial Plan

Work commenced on preparation of a financial plan to provide objectives and strategies for the short and long term financial management of the Department. The main financial objectives identified are:-

To annually seek Consolidated Revenue Funds and General Loan and Capital Work Funds to enable the Department to fulfil its charter for non-commercial functions.

To ensure that the Forest Resources Management Program and commercial activities of other programs are fully self funded, based on internal funding, not borrowings, for capital expenditure.

Accounting Manual

An accounting manual was prepared and issued to provide instruction to staff and assist in the effective and efficient financial management of the Department. The manual is in loose leaf form to allow for regular updating.

Productivity Improvements

A high priority has been given to ongoing improvement of the productivity and effectiveness of the finance function. A minor re-organisation of the Finance Branch was implemented to allow a Quality Assurance Officer to be appointed to ensure timely checking of key accounting transactions. Various manual procedures were computerised. The benefit of these improvements, and of the new financial systems, will be reflected in reduced costs and improved service for the finance function in future years.

Performance Evaluation

Indicator:

The extent to which expenditure out-turn each year is below the approved estimate, taking into account amendments approved during the year and unbudgeted expenditure on natural disasters.

Measure:

For 1989/90 expenditure was below approved estimate and expenditure on natural disasters was absorbed within the estimate.

Indicator:

The extent to which revenue from commercial programs covers the cost of the program.

Measure:

As shown in the table at page 19, revenue exceeded the operating cost of the Forest Resources Management Program in 1989/90.

Information Technology

Systems

Implementation of an integrated financial accounting system under the management of Finance Branch has been a major undertaking during the year. This included the development of tender specifications, and the subsequent intensive evaluation of the submissions received. ORACLE was the successful vendor with their financial system installed. The finance project is currently at the implementation phase. An additional tender was also called for a data base management system (DBMS) to service the corporate information requirements and this was also awarded to ORACLE.

The Logging Operation Information System (LOIS) was enhanced during the year with new management reports, enquiry and contract monitoring systems being provided. Poles and bridge timbers can now also be processed by LOIS.

The development of a forest operation control information system (FOCIS) is being undertaken as a corporate initiative to provide the financial and management details initially for sharefarming activities but with scope for incorporating overall forestry operations. It is intended to interface this system with economic modelling and the geographic information system.

With the acquisition of the additional VAX computers, the Records Management System (RMS) was able to be transferred from the Concurrent Computer. At the same time an upgraded version of the software was introduced which enhanced response time and provided improved access to the database. This also facilitated the use of portable bar code readers for file audits and tracking.

Hardware

Following the IT strategy formulated in 1988 to move to a single vendor environment, acquisition of two Digital Equipment Corporation (DEC) VAX 6410's computers was finalised during the year. They are dedicated to service scientific and commercial demands.

The two new computers, each with a processing speed of 7 MIPS (Million Instructions per Second), have been connected together and with the existing DEC Intervax 3500, rated at 3 MIPS, to form a local area cluster. Overall, the hardware upgrade provided the Department with approximately a 240 percent increase in mainframe computing power.

The purchase of additional disk drives and conversion of some existing disks to new formats has provided up to a 100 percent increase in storage for some operational systems.

Equipment was also installed to ensure an efficient secure and reliable back-up procedure to the clustered VAX computers. A gateway was installed to provide a direct link to systems at the Government's Computing Bureau.

The Department is maintaining its commitment to providing a high level of support to users of more than 200 microcomputers distributed throughout all regions, districts and branches. Some difficulty has been experienced in this area during the year.

Corporate Information Resources

Library

The library provides scientific literature information and allied services to a wide internal and external (through inter-library loans) client base.

Changes in the servicing of clients are reflected this year by increases in inter-library loans and establishment of on-line access to the Dialog database in the US, to declines in journal loans and photocopying of articles, papers etc. Part of the decline in these areas can be attributed to the

discontinuation of "CALM Alert" for financial reasons which provided documentation on current journal acquisitions. Journal circulation to CALM offices has been reintroduced to restore this information flow.

The library has continued to use PC databases to automate its catalogue information.

With a growing number of local collections being generated in regions, districts and branches, an in-house developed software package will be made available to enable an adequate information database on these collections to be compiled.

The main Woodvale Library and the Herbarium Library service the Woodvale Research Centre and Herbarium with full-time library staff.

A resource centre library is located at State Operational Headquarters and is staffed one day per week.

A nominal library is maintained at Murdoch House but is not considered satisfactory.

The lack of sufficient resources to provide an appropriate science and forest technology awareness service is a major deficiency in the service provided by the library.

Land Information

The Department's principal programs have been supported during the year by:

- . Production of Disease Risk Maps for a total of 1 770 ha covering 21 forest blocks.
- . Provision of Aerial Surveillance and Prescribed Burn Plans. Regional and district fire coordination maps and lookout tower maps have been maintained.
- . Products generated for sharefarming agreements which have included leases, diagrams and plans, soil survey bases, and interim plantation layout plans. New procedures and methods were introduced to improve the work flow and reduce turn-round time.
- . Production of specialised computer-generated maps for incorporation into the new timber supply contracts and for assisting in timber management planning.
- . Photogrammetric mapping of forest clearing within bauxite and gold mining leases in the Jarrahdale, Dwellingup and Harvey areas.
- . Provision of maps for the gazettal of marine parks and the Hamelin Pool Marine Nature Reserve.
- . Significant analysis using the Geographic Information System and the presentation of information for the report on the proposed Hill River Project.
- . Recording the changes in land tenure status in the tenure mapping system as a result of the review of B and C class reserves.
- . Producing special cartographic materials for publications and brochures.
- . Continuing digitisation of plantation maps.
- . Developing computer procedures to manage the integration of data collected for the Jarrah Inventory Project into the Department's corporate relational database.
- . Continuing the maintenance and enhancement of the Forest Management Information System (FMIS).

Providing maps and reports for regional and area management plans.

Provision of the coloured map series of the South-west has continued, although other priorities have slowed the rate of production.

Research into the application of airborne and satellite remote sensing for monitoring and mapping vegetation status has continued.

A Digital Mapping System to provide a corporate topographic/cadastral database of the CALM Estate was developed and became operational in March 1990. Acquisition of data will continue until 1995. The system has been provided to the Department of Land Administration as the basis of a 'whole of Government' standard.

Active liaison and data interchange with other agencies has continued, including the supply of specialised reports, map products and digital data for projects such as the South West Development Authority's 2020 Vision workshop and the Select Committee on Land Conservation. The land-related information requirements for the Perth Metropolitan Regional Open Space Task Force were met by a consultative approach by DOLA, DPUD and CALM. An outcome for CALM from this project has been the establishment of a land tenure database for the Metropolitan Region.

The Department's Director of Information Resources has continued in the role of Chairman, Western Australian Land Information System (WALIS).

Technical papers on GIS applications were presented at two national conferences. Joint authors of a technical paper on forest inventory published in an international journal were awarded a President's citation for practicality.

Records Management

Service to the Department has been improved with the installation of a new version of RMS on the VAX computer. Maintaining knowledge of the status and physical location of files and correspondence is efficiently handled. An archiving and disposal service is maintained.

The Records Branch has been given the responsibility for maintaining the Department's Parliamentary Question Database, requiring the tasks of updates, backups and integrity checks to be performed in conjunction with the Corporate Executive staff. Responsibility for the Research Reference Database has been delegated to the branch.

Engineering Services and Stores

Fleet Management and Workshops

The Department commissioned 219 new replacement vehicles and four additional vehicles.

Included in the replacements were two 4x4 gang trucks, one 4x4 fire truck, plus one bulldozer for operations in the Southern Forest Region.

Regional workshops at Manjimup, Collie and Mundaring carried out normal fleet maintenance, major plant repairs and specialised equipment development and fabrication. Ten small District workshops in the forest areas undertook normal fleet maintenance. Considerable use was made of private business workshops.

Measure:

The operating costs of the fleet declined in real terms. This continuing trend reflects the Department's sound fleet management practices.

Housing and Buildings

The Insectory at Manjimup was completed. Extensions to the WA Herbarium were substantially completed.

The transfer of departmental houses to the Government Employees' Housing Authority was, with a few exceptions, completed by July 1989.

Stores

The Stores Management System was maintained throughout the financial year.

At the close of the year there were 1 369 stock lines which consisted of 629 publications, 372 stationery items and 368 forms.

An information and coordination service was maintained in relation to product source and supply, disposal matters, transport, materials handling and inventory control.

Development work was carried out to prepare for the proposed delegation of some purchasing functions from the State Tender Board.

Measure:

Transactions comprising 15 887 issues, 861 receipts and 96 credits went through the Stores Section during the year.

Consulting Services

A mechanical engineering consulting service continued for the softwood and hardwood planting schemes and nursery operations.

Consultant work on buildings, telephones, accommodation and properties continued.

Radio Communications

The Department has an extensive radio communications network (1 147 radios) providing communication throughout the State between base stations, vehicles, marine craft and aircraft.

New VHF radio repeater stations were installed to improve radio communications at:

- . Reynold Hill for the Fitzgerald River National Park;
- . Beaver Road in the Donnelly River and Lake Jasper area;
- . Red Hill for Katanning District and the Wheatbelt Region.

These installations were carried out in conjunction with other Government or semi Government organisations where possible.

Trial portable VHF repeaters were also installed at Barowanna Hill in the Millstream-Chichester National Park and Mt No-name in the Hamersley Range National Park. Associated radios were installed in offices of local park rangers.

Remote control radios were installed at six other locations to extend the use of the VHF network.

The second stage of the radio replacement program was undertaken with replacements being made to:

- . 26 of the 33 radio repeaters
- . 9 spotter aircraft VHF highband radios
- . 9 spotter aircraft VHF lowband radios

- . 32 District office VHF radios
- . 20 District office aeronautical radios
- . 95 VHF mobiles in the Pemberton and Manjimup Districts.

A radio service visit to the Kimberley and Pilbara Regions was carried out during July and August. At the same time improved HF antennas were installed at the regional offices.

The ninth VHF and the fourth aeronautical radio channels were introduced to the radio networks to ease congestion and interference problems.

New installations of 189 VHF and 40 HF radios were completed in a range of vehicles, caravans and marine craft.

Radio communications refresher courses were conducted throughout the Department with staff receiving training in radio procedure and operations. The training was extended to include the use of data equipment used in large fire operations.

COMMONWEALTH GOVERNMENT ASSISTANCE

Commonwealth funds make an important contribution to conservation and land management in this State, are highly valued and carefully sought and managed. During 1989/90 the Department continued to enjoy a close liaison with Commonwealth agencies and was successful in attracting considerable assistance under a variety of funding programs.

A four year Commonwealth/State funded project was concluded in June 1990 into the research and development of commercial techniques and equipment to convert regrowth eucalypts into value added products, particularly furniture. VALWOOD is the major result of this public interest project.

In April 1990 a new book - 'Western Australia's Endangered Flora' was launched. This was the product of over ten years of research into Western Australia's endangered flora. The book which aims to stimulate interest in the State's flora and assist land owners, botanists, CALM staff and members of the public with plant identifications would not have been possible without generous grants from the Commonwealth.

The Australian National Parks and Wildlife Service (ANPWS) continued to provide funding under its States Cooperative Assistance Scheme and its Contract Employment Program for Aborigines in Natural and Cultural Resource Management (CEPANCRM). Over \$120,000 was received from the States Cooperative Assistance Scheme to carry out nature conservation projects relating to wildlife and national parks and reserves.

During 1989/90 the ANPWS introduced the Endangered Species Program. This is a parallel program to the States Cooperative Assistance Program and focuses on the provision of funds for projects relating to rare or endangered species or their habitats. Funding from this source and the Department of Primary Industry and Energy, has enabled, amongst other projects, the continued research into the control of foxes which have become a significant threat to native fauna.

Funding was once again received from the Commonwealth as a contribution to the National Afforestation Program and the National Soil Conservation Program. The Australian Biological Resource Study (administered by the Department of the Arts, Sports, the Environment, Tourism and Territories) once again provided funds for plant taxonomic research.

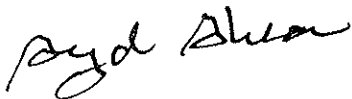
SUMMARY OF COMMONWEALTH FUNDING 1989/90

SOURCE	AMOUNT (\$)
ANPWS - CEPANCRM	127 120
- States Cooperative Assistance	121 200
- Endangered Species Program	180 575
Department of Employment Education & Training	9 287
Department of Industry Technology & Commerce	20 000
Department of Primary Industry & Energy	
- National Afforestation Program	920 000
- National Soil Conservation Program (via Dept. Agriculture)	33 000
- Small Eucalypt Processing Study	308 000
- Other Projects	23 000
Australian Centre for International Agricultural Research (ACIAR)	134 000
Department of the Arts, Sport, the Environment, Tourism and Territories	
- National Rainforest Conservation Program	59 000
- ABRS	61 300
Other	58 500
TOTAL	\$2 054 982

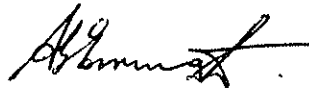
FINANCIAL STATEMENTS

The accompanying financial statements have been prepared in compliance with the provisions of the Financial Administration and Audit Act 1985 from proper accounts and records to present fairly the financial transactions for the financial year ending 30 June 1990 and the state of affairs as at 30 June 1990.

At the date of signing we are not aware of any circumstances which would render the particulars included in the financial statements misleading or inaccurate.



ACCOUNTABLE OFFICER



PRINCIPAL ACCOUNTING OFFICER

OPINION OF THE AUDITOR GENERAL OF WESTERN AUSTRALIA

**DEPARTMENT OF CONSERVATION
AND LAND MANAGEMENT**

The accounts of the Department of Conservation and Land Management have been audited for the period July 1, 1989 to June 30, 1990 under the provisions of the Financial Administration and Audit Act 1985.

In my opinion

- (i) the controls exercised by the Department of Conservation and Land Management were sufficiently adequate to provide reasonable assurance that the receipt and expenditure of moneys and the acquisition and disposal of property and the incurring of liabilities have been in accordance with legislative provisions; and
- (ii) the Statements of Receipts and Payments, including notes thereto are based on proper accounts and records so as to present fairly the transactions for the period.

N. E. Smith
ACTING AUDITOR GENERAL
November 6, 1990

OPINION OF THE AUDITOR GENERAL OF WESTERN AUSTRALIA

**DEPARTMENT OF CONSERVATION
AND LAND MANAGEMENT
PERFORMANCE INDICATORS 1989-90**

The performance indicators of the Department of Conservation and Land Management have been submitted for audit under section 63 of the Financial Administration and Audit Act 1985, but have not been audited.

As detailed in the August 31, 1989 Report of the Auditor General to Parliament, the opinion had been formed that it was not possible to conduct an audit of performance indicators as required by the legislation. Since they have not been audited I am not in a position to, and do not, express an opinion on the performance indicators of the Department of Conservation and Land Management for the period July 1, 1989 to June 30, 1990.

N. E. Smith

ACTING AUDITOR GENERAL
November 6, 1990

**GOVERNMENTAL OPERATING & TRUST ACCOUNT
CONSERVATION AND LAND MANAGEMENT FUND
STATEMENT OF RECEIPTS AND PAYMENTS
FOR THE FINANCIAL YEAR ENDED 30 JUNE 1990**

1988/89	\$	\$	DETAILS	\$	1989/90	\$
3 640 195			Balance as at 1 July		1 613 246	
			This is represented by:			
		138 760	Operating Funds Account	218 839	DR	
		3 345 691	Capital Funds Works Account	1 696 833		
		<u>155 744</u>	Nature Cons. & Nat Parks Trust A/C	<u>135 252</u>		
			Receipts			
		85 830 128	Operating Funds Account	107 072 955		
		19 119 480	Capital Works Account	15 397 504		
		31 908	Nature Cons & Nat Parks Trust A/C	90 851		
			Wood Utilisation Research A/C	57 574		
			Goldfields Dust Abatement A/C	84 265		
			Specific Purpose Grants A/C	<u>10 000</u>		<u>122 713 149</u>
<u>104 981 516</u>						<u>124 326 395</u>
108 621 711						
			Payments			
		86 187 727	Operating Funds Account	106 849 469		
		20 768 338	Capital Works Account	15 994 431		
		52 400	Nature Cons & Nat Parks Trust A/C	57 733		
			Wood Utilisation Research A/c	nil		
			Goldfields Dust Abatement A/c	80 675		
			Specific Purpose Grants A/C	<u>nil</u>		<u>122 982 308</u>
<u>107 008 465</u>						
<u>1 613 246</u>			Balance as at 30 June			<u>1 344 087</u>
			This is represented by:			
		218 839	DR Operating Funds Account	4 647		
		1 696 833	Capital Works Account	1 099 906		
		135 252	Nature Cons. & Nat Parks Trust A/C	168 370		
			Wood Utilisation Research A/C	57 574		
			Goldfields Dust Abatement A/C	3 590		
			Specific Purpose Grants A/C	<u>10 000</u>		

The purpose of the Fund is to hold moneys derived under Sections 64 and 68 of the Conservation and Land Management Act 1984.

Details of the various accounts are contained in the appropriate statements which follow.

The balance of this fund is held at and invested by Treasury with the interest from the investment being credited to the Conservation and Land Management Trust Fund.

**OPERATING FUNDS ACCOUNT
STATEMENT OF RECEIPTS & PAYMENTS
FOR THE FINANCIAL YEAR ENDED 30 JUNE 1990**

1988/89		Estimate	1989/90	Variation
\$		\$	Actual \$	\$
138 760	Balance as at 1 July	219 000 DR	218 839 DR	161
RECEIPTS				
80 189 000	Consolidated Revenue Fund	100 841 000	100 841 000	-
1 505 408	Recoupable Projects (1)	925 000	1 861 495	936 495
304 584	Saleable Publications	285 000	290 628	5 628
5 000	Youth Trainee Scheme (2)	-	1 585	1 585
209 134	Aboriginal Community Development (3)	-	25 766	25 766
102 728	Other Wildlife Recoups (4)	-	225 173	225 173
39 923	Heritage Trails (5)	-	-	-
1 066 809	Income from National Parks	879 000	1 043 351	164 351
917 375	MRD Road Grants (6)	1 572 000	852 343	(719 657)
Commonwealth Recoups -				
349 759	Wood Utilisation Res. Project (7)	367 000	334 376	(32 624)
516 529	Wildlife Special Projects (4)	175 000	672 033	497 033
126 354	National Employment Strategy for Aboriginals	140 000	122 130	(17 870)
<u>497 525</u>	National Afforestation Program (8)	<u>500 000</u>	<u>803 075</u>	<u>303 075</u>
85 968 888		105 465 000	106 854 116	1 389 116
PAYMENTS (9) (10)				
28 469 503	Salaries & Allowances	29 797 000	30 853 450	1 056 450
15 981 449	Corporate Services	13 970 000	16 166 137	2 196 137
11 879 639	Debt Servicing Costs	14 278 000	14 421 071	143 071
4 352 754	Environmental Protection	4 755 000	4 429 845	(325 155)
2 485 419	Engineering Services	2 895 000	1 572 678	(1 322 322)
2 419 501	Recreation & Tourism Services	2 696 000	2 173 714	(522 286)
1 987 447	Research & Planning	1 864 000	1 679 986	(184 014)
16 839 754	Commercial Operations	34 547 000	33 327 437	(1 219 563)
399 854	Information Services	366 000	602 617	236 617
1 081 792	Natural Disasters	95 000	1 369 234	1 274 234
<u>290 615</u>	W.A. Herbarium	<u>202 000</u>	<u>253 300</u>	<u>51 300</u>
86 187 727		105 465 000	106 849 469	1 384 469
218 839DR	Balance as at 30 June	-	4 647	4 647

NOTES TO OPERATING FUNDS STATEMENT

- (1) The Department frequently carries out works of a recoupable nature. However, commitments are not always known at the time the budget is framed and as a consequence, large discrepancies can occur between the estimate and the actual amount received. In 1989/90 the bulk of the excess receipts was due to the supply of large orders of seedlings for various tree planting operations on private property.
 - (2) This amount represents the balance of funds recouped from the Department of Employment & Training in for expenditure incurred in 1988/89.
 - (3) This amount represents the balance of funds recouped from the Aboriginal Affairs Planning Authority for expenditure incurred in 1988/89.
 - (4) Funding for Wildlife Special Projects is provided by the Commonwealth Government and other conservation organisations. Grants are for specific purposes and do not necessarily bear any comparison in dollar terms to grants on previous years. Grants are received usually as a result of an application for funds. The applications to the various funding authorities are made continuously throughout the year and the results of many applications are not known at the time the budget is framed. As a consequence, large discrepancies can occur between the estimate and the actual amount received. As the grants are received on a recoup basis they do not affect the Department's call on funds from Consolidated Revenue.
 - (5) The Heritage Trails project was a Bicentennial project completed during the 1988/89 financial year.
 - (6) Less work than anticipated on MRD-funded roads led to the reduction in receipts.
 - (7) This amount represents the Commonwealth Government's contribution to the joint Commonwealth/State/Industry Research Project. This funding ceased at 30 June 1990.
 - (8) CALM is receiving funding from the Department of Primary Industries and Energy for several projects:-
 - a) Demonstration of the integration of short rotation eucalypts into the agricultural system in South West Western Australia.
 - b) Afforestation of farm land in the South West, using Karri.
 - c) Commercial potential of Eucalyptis Camaldulensis.
- Recoups received during 1989/90 for the above projects were
- a) 533,875 b) 204,600 and c) 64,600.
- (9) Expenditure for 1989/90 was \$20 661 742 greater than for 1988/89. A significant proportion of this increase was due to the Department assuming responsibility for the payment of logging contractors from 1 January 1990.
- Other significant increases were:
- (a) Salaries and Allowances - \$2 383 947. National Wage Case increases of 3% in September 1989 and April 1990 together with the full year flow on cost of increases granted in 1988/89 were major contributors to this increase.
 - (b) Debt Servicing Costs - \$2 541 432.
- Gross expenditure exceeded the estimate by \$1 384 469, but no extra CRF funds were required due to offsetting increases in funds for works of a recoupable nature.
- The single line appropriation is designed to give the Department the ability to rearrange expenditure priorities from year to year and to meet changes in priorities during the year.
- (10) Operative expenditure claims on hand but unpaid at 30 June 1990 amounted to \$345 186.

**CAPITAL WORKS PROGRAM
STATEMENT OF RECEIPTS & PAYMENTS
FOR THE FINANCIAL YEAR ENDED 30 JUNE 1990**

1988/89		Estimate	1989/90	Variation
\$		\$	\$	\$
3 345 691	Balance as at 1 July	1 697 000	1 696 833	(167)
RECEIPTS				
14 726 000	Borrowings	13 777 000	13 777 000	-
	Commonwealth Grant			
83 855	Bicentennial Trust Fund	-	-	-
98 888	Contribution Main Roads Dept	148 000	108 000	(40 000)
1 247 219	Mining Compensation	1 146 000	1 550 377	404 377
2 609 116	Sale of Plant (2)	-	-	-
10 120	Other (4)	2 100 000	100	(2 099 900)
232 355	Cash Order Balance	110 000 DR	226 898 DR	(116 898)
<u>111 927</u>	Plant W/Shop - Operating Cost (3)	<u>-</u>	<u>188 925</u>	<u>188 925</u>
22 465 171		18 758 000	17 094 337	(1 663 663)
PAYMENTS (5) (6)				
3 111 238	Estab & Tending Hardwood Forests	4 000 000	3 513 132	(486 868)
5 512 669	Estab & Tending Softwood Forests	6 233 000	4 978 385	(1 254 615)
1 349 764	Access Road - Construction	1 418 000	1 146 980	(271 020)
637 180	Land Purchase	2 363 000	712 301	(1 650 699)
2 756 927	Plant & Equipment (2)	277 000	138 796	(138 204)
225 360	Buildings	379 000	242 930	(136 070)
378 710	Ningaloo Marine Park	-	-	-
1 184 716	Softwood Sharefarming	1 233 000	1 123 888	(109 112)
2 866 996	Hardwood Sharefarming	734 000	2 397 039	1 663 039
865 763	Central Nursery Development	-	-	-
<u>1 879 015</u>	Nat. Parks Develop & Improvement	<u>2 121 000</u>	<u>1 740 980</u>	<u>(380 020)</u>
20 768 338		18 758 000	15 994 431	(2 763 569)
1 696 833	Balance as at 30 June	-	1 099 906	1 099 906

NOTES TO CAPITAL STATEMENT

(1) Borrowings

The outstanding principal at 30 June 1989 was \$77 261 669.

During the year, loans to the value of \$13 777 000 were raised.

Principal and interest payments during the year amounted to \$2 456 627 and \$10 981 032 respectively. In addition, proceeds from sinking fund investments with the Treasury amounting to \$242 668 were applied to the reduction of loans due to the WA Treasury Corporation.

A debt liability of \$1 486 110 was transferred to the Government Employees Housing Authority when the transfer of departmental housing to that Authority was effected on 1 January 1990.

The outstanding principal at 30 June 1990 was \$86 853 264.

The level of indebtedness is a matter of increasing concern. The Department is unable - under existing legislation - to use proceeds from the sale of timber to extinguish its debt.

Softwood Forestry Agreement Loans.

Between the years 1966/67 and 1982/83, the Commonwealth Government provided loans amounting to \$10 078 510 for the purpose of establishing and tending softwood plantations. The outstanding principal at 30 June 1989 was \$8 616 672. During the year principal and interest payments amounted to \$242 547 and \$830 865 respectively. The outstanding principal at 30 June 1990 was \$8 374 125.

(2) Plant & Equipment

The Department finances the replacement of its plant and equipment from the sale of its existing plant & equipment and by the levy of a plant replacement surcharge which is included in the operating costs levied for vehicle usage.

1989/90 costs of \$4 444 190 were financed from sales of \$2 921 608, plant replacement surcharge of \$1 383 786 and Capital Works funds of \$138 796.

(3) Plant Workshop - Operating Costs

The Department operates a fleet management system which is designed to charge all items of expenditure on which plant is used with the cost of using the plant.

For 1989/90 total operating expenses including licensing, insurance and the plant replacement surcharge were \$5 321 211 whilst the plant hire charges and rebates on diesel fuel used for forestry purposes totalled \$5 510 136.

The balance of \$188 925 reflects the surplus hire charge relating to Capital Works expenditure.

(4) At the time the budget was framed it was intended that sharefarming would be funded from a Tree Trust to be established for the purpose. That funding did not eventuate, and sharefarming was funded by a reallocation of the other available funds.

(5) For the reason stated in note (4), significant variations occurred between estimated & actual expenditure.

(6) Capital expenditure claims on hand but unpaid at 30 June 1990 amounted to \$256 527.

**CONSOLIDATED REVENUE FUND
REVENUE COLLECTIONS
FOR THE FINANCIAL YEAR ENDED 30 JUNE 1990**

1988/89		Estimate	1989/90 Actual	Variation
\$		\$	\$	\$
	Territorial Revenue			
16 443 720	Sawlog Royalties	18 013 000	16 698 527	(1 314 473)
6 620 531	Sandalwood	7 000 000	6 619 405	(380 595)
5 244 717	Chip Logs	6 001 000	4 644 965	(1 356 035)
<u>375 079</u>	Other	<u>462 000</u>	<u>481 065</u>	<u>19 065</u>
28 684 047		31 476 000	28 443 962	(3 032 038)
	Departmental Revenue			
1 409 671	Fees	733 000	945 672	212 672
9 656 138	Pine Conversion Sales	14 717 000	12 564 024	(2 152 976)
14 366 530	Hardwood Conversion Sales	32 247 000	27 883 018	(4 363 982)
265 428	Recoupable Projects	250 000	273 140	23 140
129 275	Wildlife	120 000	139 413	19 413
<u>372 966</u>	Sales of Assets	<u>340 000</u>	<u>583 623</u>	<u>243 623</u>
26 200 008		48 407 000	42 388 890	(6 018 110)
<u>54 884 055</u>	GRAND TOTAL	<u>79 883 000</u>	<u>70 832 852</u>	<u>(9 050 148)</u>

Actual revenue collected was much lower than estimated due to the downturn in the economy and in particular the housing industry.

**CONSOLIDATED REVENUE FUND
APPROPRIATION FOR THE FINANCIAL YEAR
ENDED 30 JUNE 1990**

1988/89		1989/90		
\$		Estimate \$	Actual \$	Variation \$
80 189 000	Amount required for services for the year (paid to Conservation & Land Management Trust Fund)	100 841 000	100 841 000	nil

The CRF appropriation for 1989/90 was \$20 652 000 more than for 1988/89. The main contributors to the increase were:

- (a) Commercial Operations - \$17 700 000; due primarily to the Department assuming responsibility for the payment of logging contractors from 1 January 1990.
- (b) Debt Servicing Costs - \$2 400 000; mainly represents principal and interest payments relating to borrowings for the 1988/89 Capital Works Program.

SUPPLEMENTARY FINANCIAL INFORMATION

- * The Financial statements have been prepared on a cash basis in that only collections received and payments made are reflected therein. The disbursements include a net payment of \$192 000 to the Treasury Departmental Receipts in Suspense Account for accrued salaries.

- * Losses of public moneys and public or other property:

	1988/89		1989/90	
Revenue	\$	\$	\$	\$
Irrecoverable amounts	9 607.49		26.29	
Other	<u>263.13</u>	9 870.62	<u>137.00</u>	163.29
General (includes thefts reported to Police, lost property, stock-taking deficiencies etc)		<u>110.76</u>		<u>Nil</u>
		9 981.38		163.29

- * Public and other property, revenue and debts to the State, written off in accordance with section 45 of the Financial Administration & Audit Act.

	1988/89	1989/90
	\$	\$
Approved by the Executive Director	1 153.80	163.29
Approved by the Hon. Minister	<u>8 827.58</u>	<u>Nil</u>
	9 981.38	163.29

Revenue due, but not collected at 30 June 1990 was \$8 117 879. It is expected that all but \$3 972 will be collected.

**NATURE CONSERVATION & NATIONAL PARKS
TRUST ACCOUNT
STATEMENT OF RECEIPTS & PAYMENTS
FOR THE FINANCIAL YEAR ENDED 30 JUNE 1990**

1988/89		1989/90
\$		\$
155 744	Balance as at 1 July	135 252
RECEIPTS		
886	Game Licenses	50 635
8 869	Flora Licenses	13 205
2 658	Bequests & Gifts	5 332
<u>19 495</u>	Interest on Investments	<u>21 679</u>
187 652		226 103
PAYMENTS		
10 250	Monitoring Waterfowl Abundance 1988/91	
12 000	RAOU Waterbird Population Study	
4 000	Flora Study - Boronia	
	Aust Sealion Study	5 100
2 850	NZ Fur Seal Study	
	Western Swamp Tortoise	19 000
	Swan Coastal Plain Wetlands Study	20 000
5 500	Numbat Research	332
	Duck Counting	11 518
13 800	S/W Waterbird	
	Herdsmen Lake Argentine Ant Study	1 783
<u>4 000</u>	Wetland/Waterfowl Assessment	<u>57 733</u>
52 400		
135 252	Balance as at 30 June	168 370

Section 68 of the Conservation & Land Management Act 1984 provides for the establishment of the Nature Conservation and National Parks Trust Account within the Conservation and Land Management Trust Fund. The Account is credited with money derived under the Wildlife Conservation Act 1950 and income from investments, gifts, devises, bequest and donations. The funds may be applied to research or any other purpose relating to the conservation of fauna and flora, or the management of National Parks, Nature Reserves, Marine Nature Reserves or Marine Parks, subject to compliance with any conditions imposed in connection with any gifts or bequests.

**WOOD UTILISATION RESEARCH COMMITTEE
TRUST ACCOUNT
STATEMENT OF RECEIPTS & PAYMENTS
FOR THE FINANCIAL YEAR ENDED 30 JUNE 1990**

	1989/90 \$
RECEIPTS	
Proceeds from Sales	<u>57 574</u>
Balance as at 30 June	57 574

In 1986 a 4 year research project jointly funded by the Commonwealth Government, CALM and the Timber Industry was established to improve the utilisation of timber previously thought to be unusable.

The Wood Utilisation Research Committee Trust Account was established during 1989/90 to ensure that the project would continue beyond June 1990.

**GOLDFIELDS DUST ABATEMENT
COMMITTEE TRUST ACCOUNT
STATEMENT OF RECEIPTS AND PAYMENTS
FOR THE FINANCIAL YEAR ENDED 30 JUNE 1990**

RECEIPTS

Balance transferred from City of Kalgoorlie-Boulder	6 765
City of Kalgoorlie-Boulder Grant	20 000
Chamber of Mines Grant	20 000
Clearing Compensation	30 000
Recoups	<u>7 500</u>
	84 265

PAYMENTS

CALM Salary Recoup	11 734
Regeneration Zone 1E	29 999
GDAC Regeneration Zones	16 911
Tree Planting and Rehabilitation	3 986
CALM Administration Costs	4 000
Public Education	170
CALM Wages & Plant Recoup	12 735
Direct Seeding Trials	<u>1 140</u>
	80 675
Balance as at 30 June	3 590

The Goldfields Dust Abatement Committee is a community based committee established in Kalgoorlie-Boulder in 1973.

Up until February 1990 the funds of the Committee were managed by the City of Kalgoorlie-Boulder. CALM received an approach from the Committee to assume the responsibility for management of the funds and the employment of the Dust Abatement Officer. This responsibility was assumed as from 1 February 1990.

**SPECIFIC PURPOSE GRANTS TRUST ACCOUNT
STATEMENT OF RECEIPTS & PAYMENTS
FOR THE FINANCIAL YEAR ENDED 30 JUNE 1990**

RECEIPTS	1989/90
	\$
Grant for Lake Geogorup	<u>10 000</u>
Balance as at 30 June 1990	10 000

The Specific Purpose Grants Trust Account was established during 1989/90 to account for money's given to CALM for specific purposes.

In the case of Lake Geogorup the money is to be invested and the proceeds from that investment used to assist in the continuing management of the foreshore reserve of Lake Geogorup.

**PRIVATE TRUST ACCOUNT
C.E. LANE POOLE MEMORIAL TRUST
STATEMENT OF RECEIPTS & PAYMENTS
FOR THE FINANCIAL YEAR ENDED 30 JUNE 1990**

1988/89		1989/90
\$		\$
2 445	Balance as at 1 July	2 615
RECEIPTS		
-	Donations	6 100
<u>458</u>	Interest on Investments	<u>395</u>
2 903		9 110
PAYMENTS		
-	Printing	263
<u>288</u>	Travel Costs Associated with Award	<u>2 105</u>
288		2 368
2 615	Balance as at 30 June	6 742

The purpose of this fund is to assist with extending the knowledge and experience of awardees by study and for travel in Australia or overseas, on topics of value to the Department of Conservation and Land Management.

The balance of this trust fund is held at and invested by Treasury. Proceeds from the investments are credited to the trust fund as the investments mature.

**PRIVATE TRUST ACCOUNT
RESEARCH CO-ORDINATING COMMITTEE
STATEMENT OF RECEIPTS & PAYMENTS
FOR THE FINANCIAL YEAR ENDED 30 JUNE 1990**

1988/89		1989/90
\$		\$
9 284	Balance as at 1 July	10 188
RECEIPTS		
<u>904</u>	Interest on Investments	<u>2 133</u>
10 188		12 321
PAYMENTS		
<u>nil</u>	Balance as at 30 June	<u>nil</u>
10 188		12 321

The purpose of this fund is to hold funds for research projects as approved by the Research Co-ordinating Committee.

The balance of this trust fund is held at and invested by Treasury. Proceeds from the investments are credited to the trust fund as the investments mature.

**PRIVATE TRUST ACCOUNT
DIEBACK RESEARCH TRUST FUND
STATEMENT OF RECEIPTS & PAYMENTS
FOR THE FINANCIAL YEAR ENDED 30 JUNE 1990**

1988/89		1989/90
\$		\$
10 278	Balance as at 1 July	14 555
RECEIPTS		
<u>4 277</u>	Interest on Investments	<u>3 038</u>
14 555		17 593
PAYMENTS		
<u>-</u>	Sundries	<u>131</u>
Nil		131
14 555	Balance as at 30 June	17 462

The purpose of this fund is to hold funds for research projects as approved by the Dieback Research Fund Committee.

The balance of this trust fund is held at and invested by Treasury. Proceeds from the investments are credited to the trust fund as the investments mature.

**PRIVATE TRUST ACCOUNT
KEYNES FORESTRY PRIZE
STATEMENT OF RECEIPTS & PAYMENTS
FOR THE FINANCIAL YEAR ENDED 30 JUNE 1990**

1988/89		1989/90
\$		\$
354	Balance as at 1 July	384
RECEIPTS		
<u>30</u>	Interest on Investments	<u>55</u>
384		439
PAYMENTS		
<u>Nil</u>		<u>Nil</u>
384	Balance as at 30 June	439

The purpose of this fund is to provide an award for the most outstanding achievement by a student at the Department's Cadet School.

The balance of this trust fund is held at and invested by Treasury. Proceeds from the investment are credited to the trust fund as the investments mature.

**PRIVATE TRUST ACCOUNT
CALM - INCOME TAX DEDUCTIONS
STATEMENT OF RECEIPTS & PAYMENTS
FOR THE FINANCIAL YEAR ENDED 30 JUNE 1990**

1988/89		1989/90
\$		\$
846 808	Balance as at 1 July	818 326
RECEIPTS		
<u>11 595 551</u>	Income Tax Deductions	<u>11 318 165</u>
12 442 359		12 136 491
PAYMENTS		
<u>11 624 033</u>	Payments to Taxation Office	<u>11 819 411</u>
818 326	Balance as at 30 June	317 080

The purpose of this fund is to hold all Income Tax Deductions from Salaries and Wages until the end of the month in which the deductions were made. The deductions are paid to the Australian Taxation Office at the beginning of the following month.

The balance of this fund is held at and invested by Treasury with the interest from the investment being credited to the Government of WA.

**PRIVATE TRUST ACCOUNT
CONTRACTOR'S DEPOSITS
STATEMENT OF RECEIPTS & PAYMENTS
FOR THE FINANCIAL YEAR ENDED 30 JUNE 1990**

1988/89 \$		1989/90 \$
212 379	Balance as at 1 July	497 543
RECEIPTS		
406 741	Deposits Lodged During Year	168 444
<u>16 690</u>	Interest from Investments	<u>96 018</u>
635 810		762 005
PAYMENTS		
<u>138 267</u>	Deposits Refunded During Year	<u>34 731</u>
497 543	Balance as at 30 June	727 274

The purpose of this fund is to hold deposits lodged by contractors to the Department of Conservation and Land Management.

The balance of this trust fund is held at and invested by Treasury. Proceeds from the investments are credited to the trust fund as the investments mature.

**PRIVATE TRUST ACCOUNT
WITHHOLDING TAX - CONTRACTORS
PRESCRIBED PAYMENTS
STATEMENT OF RECEIPTS & PAYMENTS
FOR THE FINANCIAL YEAR ENDED 30 JUNE 1990**

1988/89 \$		1989/90 \$
Nil	Balance as at 1 July	45
	RECEIPTS	
<u>1 392</u>	Withholding Tax	<u>544</u> 589
	PAYMENTS	
<u>1 347</u>	Payments to Taxation Office	<u>45</u>
45	Balance as at 30 June	544

The purpose of this fund is to hold funds deducted from contractors prescribed payments in accordance with the Income Tax Assessment Act 1936.

The deductions are paid to the Australian Taxation Office at the beginning of the month following the month in which the deductions were made.

The balance of this fund is held at and invested by Treasury with the interest from the investment being credited to the Government of WA.

**PRIVATE TRUST ACCOUNT
 WORLD WILDLIFE - GROUND PARROTS
 STATEMENT OF RECEIPTS AND PAYMENTS
 FOR THE FINANCIAL YEAR ENDED 30 JUNE 1990**

1988/89 \$		1989/90 \$
-	Balance as at 1 July	1 304
RECEIPTS		
<u>22 198</u>	World Wildlife Fund	<u>nil</u>
PAYMENTS		
<u>20 894</u>	Department of Conservation & Land Management	<u>1 304</u>
1 304	Balance as at 30 June	nil

The purpose of this fund was to hold monies to establish a program for the conservation of the ground parrot species in WA.

The balance of the fund was held at and invested by Treasury with the interest from the investment being credited to the Government of WA.

Funding from the World Wildlife Fund for this project has now ceased and the Trust Account will be closed.

**SUSPENSE
RECEIPTS & SUSPENSE
STATEMENT OF RECEIPTS & PAYMENTS
FOR THE FINANCIAL YEAR ENDED 30 JUNE 1990**

	1989/90 \$
Balance as at 1 July	517 859
 RECEIPTS	
Employees Group Deductions	696 737
Stamp Duties	120
Pine Log Levy	23 938
Hardwood Log Levy	209 906
Declared Birds	2 345
Miscellaneous	<u>57 463</u>
	1 508 368
 PAYMENTS	
Employees Group Deductions	650 965
Pine Log Levy	27 291
Hardwood Log Levy	227 441
Declared Birds	1 575
Hardwood Rooding	5 075
Miscellaneous	<u>258 542</u>
	1 170 889
 Balance as at 30 June	 337 479

The purpose of the Receipts in Suspense Account is to hold funds pending identification of the purpose for which those monies were received pursuant to Section 9(2)(c)(iv) of the Financial Administration and Audit Act.

The balance of this fund is held at and invested by Treasury with the interest from the investment being credited to the Government of WA.

ROADSIDE CONSERVATION COMMITTEE

Terms of Reference

The terms of reference of the Roadside Conservation Committee (RCC) are to coordinate and promote the conservation and effective management of rail and roadside vegetation for the benefit of the environment and the people of Western Australia.

Committee Membership

Mr J Blyth (Chairman)
Mr P Hewett (Deputy Chairman) (resigned October 1989)
Mr P Bothwell
Mr J Duff (resigned December 1989)
Mr G Hamilton (January 1990-)
Mr B Loney (October 1989-)
Cr J North
Mr G Norwell (January 1990-)
Cr I Purse
Mr J Robley
Mrs J Seabrook
Mr R Shaw (resigned December 1989)

Staff

Miss P Hussey (Executive Officer).

Meetings

Six meetings were held during the year, on 14 August 1989, 9 October 1989, 11 December 1989, 12 February 1990, 30 April 1990 and 11 June 1990. The April meeting was combined with a visit to the Shire of Dandaragan.

Sub-Committees

Several standing Sub-committees have been appointed which meet as and when necessary.

Research and Technical Investigations Sub-Committee

(To consider priorities for the allocation of research and technical investigations funds)

Chairman

Mr J Blyth

Date of Meetings:

12 July 1989, 4 December 1989 and 21 May 1990.

During 1989/90 the following research projects were funded:-

- to continue a survey of the conservation value of roadsides and place the information gathered onto computerised database.
- the identification of *Phytophthora* dieback on roadsides.
- the effect of log removal on ground fauna.
- the effect of grass-control herbicides on native plant species.
- survey and management of *Banksia goodii* on roadsides.
- publication of further sections of the "Roadside Manual".

Phytophthora Workshop

Chairman

Mr J Blyth

This workshop, to which experts were invited, was held to develop a policy and define appropriate research projects.

Date of Meeting:

3 August 1989

This workshop led to the delineation of an area of research need.

Publications

Together with the Department of Conservation and Land Management's Research Division and Greening Australia, Volume II of the "Tree Decline and Revegetation Newsletter" has been produced.

Four new brochures have been printed:

- "Carnamah-Eneabba Wildflowers"
- "Come to Kulin-Wonderful Wheatbelt Wildflowers"
- "Coorow Shire-Lesueur Area"
- "Wildflowers in Victoria Plains"

Two brochures have been reprinted:

- "Roadside Conservation Committee"
- "Wide Roadsides - Flora Drives"

A booklet has been printed - "Roadside Vegetation Clearance Guidelines".

Half the sections in a looseleaf "Roadside Manual" have been printed.

International Conference/Workshop on "Nature Conservation - The Role of Corridors"

The Committee was the coordinator for this major scientific conference which was held in Busselton in September 1989. Despite the airline pilots' strike just two weeks before the start, (which

regrettably caused cancellation from 14 proposed participants) the Conference was a great success, with 83 participants from all States and 5 overseas countries.

The Conference Proceedings will be published in book form in December 1990, and a booklet containing a public summary prior to that.

General Activities

The Committee had extensive liaison with the Country Shire Council's Association, individual Local Government Authorities, Government departments and conservation groups.

The Executive Officer has given a number of talks outlining the importance of roadside conservation and the role of the Committee.

Together with Greening Australia (WA), a "Roadside Certificate of Merit" was awarded as part of the John Tonkin Tree Awards. The winner for 1989 was Main Roads Department, Narrogin Division.

Displays were mounted at various public events including the Kings Park Wildflower Exhibition and agricultural shows at Dowerin, Quairading and Wagin.

Finance

Funds for servicing the Committee were provided from the budget of the Department of Conservation and Land Management, the Main Roads Department and Westrail.

During the financial year 1989/90 the funds expended were:-

	CALM	MRD	WESTRAIL	TOTAL
Salary	16 500	16 500	nil	33 000
Members fees, travel	8 391	nil	nil	8 391
Publications	4 302	nil	nil	4 302
Research	<u>10 300</u>	<u>10 000</u>	<u>3 000</u>	<u>23 300</u>
	39 493	31 500	3 000	68 993

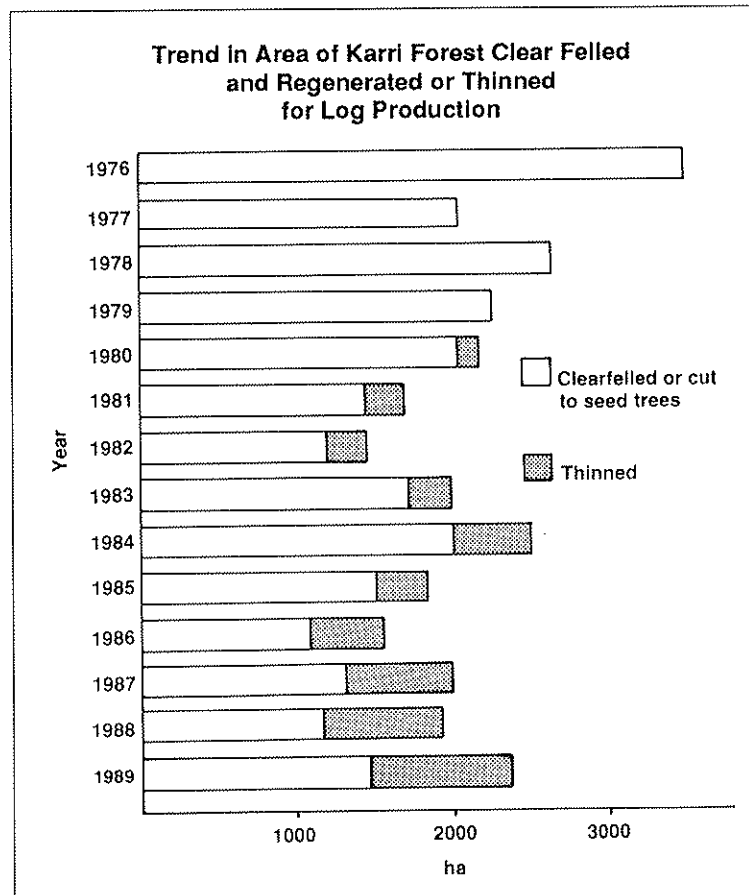
Appendices

Appendix 1

Trend in Area of Karri Forest Cut Over and Regenerated

Years (Calendar Year)	Clear felled or cut to seed trees (ha)	Removal of seed trees (ha)	Thinning regrowth forest (ha)
1976	3 521	832	-
1977	2 053	2 460	-
1978	2 656	863	-
1979	2 281	400	-
1980	2 045	743	140
1981	1 455	1 463	256
1982	1 221	1 348	262
1983	1 735	617	267
1984	2 120	945	393
1985	1 530	802	324
1986	1 094	1 203	491
1987	1 311	827	702
1988	1 180	990	750
1989	1 510	490	910

NOTE: The areas from which seed trees are removed are the same areas accounted for under 'Cut to Seed Trees', either in this or a previous reporting period. They are not additional areas of cutting.



Appendix 2 (a)

Trend in areas of Even-Aged Karri Regeneration

Year of Regeneration	Multiple Use Forest		Conservation Forest		TOTAL	
	Area (ha)	Cumulative Total (ha)	Area (ha)	Cumulative Total (ha)	Area (ha)	Cumulative Total (ha)
Before 1900	60	60	-	-	60	60
1900-09		60	-	-	-	60
1910-19	130	190	30	30	160	220
1920-29	160	350	60	90	220	440
1930-39	5 650	6 000	520	610	6 170	6 610
1940-49	720	6 720	520	1 130	1 240	7 850
1950-59	510	7 230	180	1 310	690	8 540
1960-65	220	7 450	-	1 310	220	8 760
1966	160	7 610	-	1 310	160	8 920
1967	220	7 830	80	1 390	300	9 220
1968	690	8 520	140	1 530	830	10 050
1969	1 300	9 820	300	1 830	1 600	11 650
1970	80	9 900	-	1 830	80	11 730
1971	80	9 980	10	1 840	90	11 820
1972	1 110	11 090	710	2 550	1 820	13 640
1973	190	11 280	-	2 550	190	13 830
1974	140	11 420	30	2 580	170	14 000
1975	630	12 050	430	3 010	1 060	15 060
1976	1 760	13 810	60	3 070	1 820	16 880
1977	1 630	15 440	250	3 320	1 880	18 760
1978	1 630	17 070	310	3 630	1 940	20 700
1979	1 930	19 000	300	3 930	2 230	22 930
1980	2 090	21 090	130	4 060	2 220	25 150
1981	2 980	24 070	310	4 370	3 290	28 440
1982	2 260	26 330	150	4 520	2 410	30 850
1983	1 930	28 260	370	4 890	2 300	33 150
1984	1 750	30 010	480	5 370	2 230	35 380
1985	2 330	32 340	-	5 370	2 330	37 710
1986	1 950	34 290	-	5 370	1 950	39 660
1987	1 180	35 470	-	5 370	1 180	40 840
1988	1 440	36 910	-	5 370	1 440	42 280
1989	1 230	38 140	-	5 370	1 230	43 510

Appendix 2 (b)
Trends in Eucalyptus globulus and
Eucalyptus Muellerana Plantings

Year	Karri and Muellerana mixed ha	Muellerana ha	Globulus ha
1966	7		
1974	13		
1975	26		
1979	123	17	
1980	17	10	
1981	30	25	
1982	80	10	
1983	109		
1984	88		
1985	42	14	
1986	112	64	
1987	56		
1988			1940
1989			3870
Total	703	140	5810
NOTE: Various small trial plots, gravel pit replantings and arboreta are not included in this table.			

Appendix 3 Areas of State Owned Plantations as at 31.12.89

Planting Year	P Radiata			P Pinaster and Other Species			All Species
	Area* (ha)	Second Rotation** (ha)	Cumulative Total (ha)	Area* (ha)	Second Rotation** (ha)	Cumulative Total (ha)	Cumulative Total (ha)
<1959	1388		1 388	4 707		4 707	6 095
1959	321		1 709	360		5 067	6 776
1960	618		2 327	333		5 400	7 727
1961	384		2 711	515		5 915	8 626
1962	385		3 096	416		6 331	9 427
1963	600		3 696	304		6 635	10 331
1964	576		4 272	601	9	7 245	11 517
1965	505		4 777	573		7 818	12 595
1966	647		5 424	876		8 694	14 118
1967	806		6 230	1 312		10 006	16 236
1968	762		6 992	1 431		11 437	18 429
1969	977		7 969	1 786		13 223	21 192
1970	1 042		9 011	1 396		14 619	23 630
1971	1 096		10 107	1 300		15 919	26 026
1972	1 117		11 224	1 126		17 045	28 269
1973	1 272	32	12 528	968		18 013	30 541
1974	1 376		13 904	602		18 615	32 519
1975	1 247		15 151	1 283		19 898	35 049
1976	1 549		16 700	1 103		21 001	37 701
1977	1 391		18 091	865		21 866	39 957
1978	2 032	13	20 136	557		22 423	42 559
1979	1 869	13	22 018	563		22 986	45 004
1980	1 604		23 622	1 008		23 994	47 616
1981	1 597		25 219	994	13	25 001	50 220
1982	1 617	87	26 923	711	6	25 718	52 641
1983	1 338	43	28 304	815		26 533	54 837
1984	1 984		30 288	514	8	27 055	57 343
1985	1 784	160	32 232	517	2	27 574	59 806
1986	1 253		33 485	610		28 184	61 669
1987	1 560	160	35 205	809	78	29 071	64 276
1988	2 075	160	37 440	183		29 254	66 694
1989	1 170	452	39 062	64	28	29 346	68 408

* The areas shown are the original areas planted, from which clear felled areas have been subtracted

** The areas shown are those areas which have been replanted following harvesting of the original plantation.

Appendix 4 Trend in Log Production

Year	Hardwood			Softwood			Total		
	Crown land (m ³)	Private property (m ³)	Total (m ³)	Crown land (m ³)	Private property (m ³)	Total (m ³)	Crown land (m ³)	Private property (m ³)	Total (m ³)
1986	1 331 831	127 006	1 458 837	247 637	29 121	276 758	1 579 468	156 127	1 735 595
1987	1 338 697	158 858	1 497 555	266 766	24 831	291 597	1 605 463	183 689	1 789 152
1988	1 427 624	174 519	1 602 143	302 447	31 161	333 068	1 730 071	205 630	1 935 751
1989	1 432 530	135 381	1 567 911	318 524	56 752	375 276	1 751 054	192 133	1 943 187
1990	1 319 246	80 561	1 399 807	312 520	105 865	418 385	1 631 766	186 426	1 818 192

Appendix 5

Trends in the Production and Use of Sawn Timber

Year Ended 30 June	Sawn Production			Export (m ³)	Local Use (m ³)
	Hardwood (m ³)	Softwood (m ³)	Total (m ³)		
1970	425 295	16 893	442 188	96 275	345 914
1971	420 777	21 595	442 372	79 437	362 935
1972	379 006	21 733	400 739	101 191	299 548
1973	375 135	23 283	398 418	111 547	286 871
1974	374 899	26 534	410 433	98 200	303 233
1975	368 844	27 086	395 930	100 127	295 803
1976	383 010	16 258	399 268	94 136	305 132
1977	369 151	16 685	385 836	77 352	308 484
1978	347 111	18 669	365 780	58 833	306 947
1979	331 135	18 145	349 280	66 420	282 860
1980	331 411	21 400	352 811	71 955	280 856
1981	330 863	22 954	353 817	65 109	288 708
1982	320 915	22 190	343 105	48 448	294 657
1983	252 124	13 216	265 340	41 789	223 551
1984	258 861	14 723	273 333	19 318*	254 015
1985	291 683	21 632	313 315	22 112*	291 203
1986	295 160	33 816	328 976	21 497*	307 479
1987	280 146	36 512	316 658	9 547*	307 111
1988	270 723	47 929	318 652	9 356*	309 296
1989**	289 665	53 665	342 905**	12 965*	333 549
1989***	278 984	53 222	332 206	N/A	N/A

- * Figures for interstate export of jarrah and karri timber, sawn lengthwise, sliced or peeled, but not further prepared, or a thickness exceeding 5 mm, are excluded because of confidentiality restrictions applied by the Australian Bureau of Statistics.
- ** Final confirmed production levels for 1988/89.
- *** Interim 1989 Calendar year volumes.

Appendix 6 Trend in Woodchip Production

Year	Crown Land											Total C.L. (Regrowth and Old Growth)	Private Property Chiplogs (m ³)	Total C.L. & P.P. Chiplogs (m ³)	Percentage Private Property to Total (%)
	Chips from Residue			Chiplogs from Thinning Regrowth Forest				Chiplogs from old Growth Forest Operations							
	Sawmill (t)	Forest (t)	Subtotal (t)	Marri (m ³)	Karri (m ³)	Other (m ³)	Subtotal (m ³)	Marri (m ³)	Karri (m ³)	Other (m ³)	Subtotal (m ³)				
1975-76								77 655	20 712	3	98 370	98 370		98 370	
1976-77	32 007		32 007					241 207	135 814		377 021	377 021		377 021	
1977-78	89 390		89 390					329 190	105 187		434 377	434 377		434 377	
1978-79	114 766		114 766					353 928	100 168		454 096	454 096	18 865	472 961	4.0%
1979-80	137 503		137 503	292	3 882		4 174	439 666	116 975	1 476	558 117	562 291	53 197	615 488	8.6%
1980-81	187 501		187 501	1 794	17 565		19 359	386 664	105 604	3 448	495 716	515 075	58 983	574 058	10.3%
1981-82	74 561		74 561	1 728	21 676		23 404	255 069	90 734		345 803	369 207	16 116	385 323	4.2%
1982-83	77 486		77 486	3 137	23 702		26 839	284 670	100 608		385 278	412 117	21 835	433 952	5.0%
1983-84	87 833		87 833	2 961	24 293		27 254	339 389	78 371		417 760	445 014	57 598	502 612	11.5%
1984-85	88 297		88 297	2 263	22 176		24 439	400 828	71 613		472 441	496 880	91 702	588 582	15.6%
1985-86	110 494		110 494	555	30 918		31 473	428 514	54 448		482 962	514 435	64 914	579 349	11.2%
1986-87	88 111		88 111	500	55 753		56 253	444 076	52 364		496 440	552 693	99 923	652 616	15.3%
1987-88	104 750	2 200	106 950	764	72 040		72 804	551 673	72 490		624 163	696 967	112 884	809 851	13.9%
1988-89	102 321	5 270	107 591	4 214	77 911		82 125	459 775	71 397		531 172	*613 297	91 865	705 162	13.0%
1989-90	78 150	3 324	81 474	5 161	69 442	181	74 784	376 067	83 603		459 670	*534 454	**51 021	585 475	8.7%
Cum. Tot.	1 373 170	10 794	1 383 964	23 369	419 358	181	442 908	5 368 371	1 260 088	4 927	6 633 386	7 076 294	738 903	7 815 197	9.5%

* Includes Forest Residue

** Includes 4 674 cubic metres harvested by CALM contractors

Appendix 7 Summary of Exports of Forest Produce

Year	Timber		Wood Manufacture Value (\$)	Essentials Oils and Tanning Materials (\$)
	(m3)	Value (\$)		
Brought Forward	13 081 830	177 786 912	8 536 935	17 386 964
1968	84 569	4 947 595	3 016 850	280 806
1969	86 455	4 984 098	3 802 927	267 565
1970	96 275	5 661 547	3 906 699	317 553
1971	79 362	4 803 842	2 110 802	343 512
1972	101 191	6 439 732	2 369 541	348 762
1973	111 547	7 036 637	2 604 116	337 736
1974	98 200	7 366 709	3 769 461	433 627
1975	100 127	9 080 092	132 278	479 019
1976	94 136	9 823 037	993 199	214 918
1977	77 352	10 150 025	205 173	45 767
1978	58 833	8 809 324	4 625 089	41 422
1979	66 420	10 560 052	8 122 584	61 525
1980	71 955	12 265 737	591 670	255
1981	65 109	12 331 467	1 414 745	2 361
1982	48 448	9 599 222	1 671 328	-
1983	41 798	8 295 949	1 634 839	300
1984	19 318	5 284 658	^{1*} 9 910 609	3 138
1985	22 112	7 172 934	^{2*} 351 837	2 099
1986	21 497	7 328 350	^{2*} 547 344	318
1987	9 547	4 199 069	^{2*} 965 344	-
1988	9 356	4 757 117	^{2*1} 629 591	N/A
1989	12 965	5 496 968	^{2*1} 838 584	N/A

^{1*} Includes interstate cork and wood not elsewhere included. This incorporates interstate jarrah and karri timber sawn lengthwise, sliced or peeled, but not further prepared, of a thickness exceeding 5mm, previously included in "Timber" in the years prior to and including 1982/83.

^{2*} Does not include interstate cork and wood (which is not elsewhere included either) because of confidentiality restrictions applied by the Australian Bureau of Statistics.
Source: Australian Bureau of Statistics

Appendix 9
Area of Prescribed Burning 1989/90

Indigenous Vegetation - Handburning (a)	1988/89	1989/90
State forests		
Handburns	13 698	15 341
Slash and regeneration	6 700	4 377
Indigenous areas within pine plantation zones	40	--
Clearing burns for pine establishment	1 165	45
National Parks	6 763	6 965
Nature Reserves	1 822	4 189
Other Crown Lands and Private Property	465	1 355
Total	30 653	32 272
Indigenous Vegetation - aerial ignitions (ha)		
State forest hardwood	178 656	155 562
National Parks	12 285	12 175
Nature Reserves	13 208	70 000
Other Crown Lands and Private Property	1 790	2 758
Total	205 939	240 495
State Forest Softwoods (ha)		
Winter burning under pines	5 787	5 597
Total	5 787	5 597

Appendix 10 Fire Fighting Equipment by Regions - 1990

Region	Heavy Duty	Gang Trucks	Light Patrol	Portable
Metropolitan	1	0	6	4
Northern Forest	17	14	19	12
Central Forest	27	18	14	14
Southern Forest	16	12	8	9
South Coast	5	0	15	4
Wheatbelt	2	1	6	3
Greenough	3	0	9	0
Goldfields	1	0	1	0
Pilbara	1	0	5	0
Kimberley	0	0	5	0
Totals	73	45	88	46

Hygiene Washdown Units by Regions - 1990

Region	Mobile HP/LU Trailer or Vehicle	Fixed HP/LU DHQ Electric or Petrol	Washdown Ramp - Pad
Metropolitan	1	0	1
Northern Forest	3	3	3
Central Forest	2	5	6
Southern Forest	4	3	3
South Coast	5	8	10
Wheatbelt	1	1	2
Greenough	2	1	2
Goldfields	0	0	0
Pilbara	0	0	0
Kimberley	0	0	0
Totals	18	21	27

Appendix 11

Number of Wildfires and Areas by Land Categories

	Number		Area Burnt (ha)	
	1988/89	1989/90	1988/89	1989/90
State forest hardwood	125	111	1 750	1 491
State Forest Softwood	33	44	16	165
National Parks	39	45	39 412	172 781
Nature Reserves	23	21	6 547	43 509
Other Crown Lands	82	50	24 494	23 290
Private Property	116	54	6 212	5 911
Total	418	325	78 431	247 147

Causes

	Number		Percent	
	1988/89	1989/90	1988/89	1989/90
Deliberately & Illegally lit	152	146	36	45
Escaped from Departmental prescribed burns	22	24	5	7.5
Escaped from other burning off	56	39	13	12
Accidental by timber industry	2	4	0.5	1
Accidental by other industry	36	14	9	4
Accidental by recreational visitors	19	22	5	7
Lightning	87	39	21	12
Unknown	38	34	9	10.5
Other causes	6	3	1.5	1
Total	418	325	100	100

Appendix 12

Changes to Senior Departmental Staff Level 6 and Above

Public Service Act

Armstrong R I	Senior Environmental Officer	Promoted
Atkins K J	Senior Biologist (Flora)	Transferred
Briggs A D	Regional Planning Officer	Promoted
Byrne J C	Manager, Finance	Appointed
Chandler R J	Regional Planning Officer	Promoted
Choo M	Senior Research Scientist	Promoted
Farina A	Principal Private Secretary	Transferred
Field G	Senior Community Education Officer	Reclassified
Harvey B E	Regional Operations Officer	Promoted
Hewett P N	Director of Forests	Retired
Jenkins E A	Regional Manager	Promoted
Kawalilak R A	Manager, Public Affairs	Appointed
Keene D	Director of Forests	Transferred
Kinnear J E	Principal Research Scientist	Reclassified
Kovaes Z	Press Secretary	Transferred
Lander N J	Principal Research Scientist	Reclassified
Lush A R	District Manager	Transferred
Malajczuk G	Director, Economics	Reclassified
Morris K D	Senior Research Scientist	Reclassified
Murch J H	Manager, Timber Production	Promoted
Penfold S L	Manager, Plant Propagation	Appointed
Sclater J B	Manager, Timber Production	Retired
Seymour A P	District Manager	Reclassified
Shearer B L	Principal Research Scientist	Reclassified
Skillen J A	Regional Operations Officer	Promoted
Stirling P D	Senior District Forest Officer	Transferred
Vear K R	Regional Operations Officer	Promoted
Waite M J	Senior Environmental Officer	Promoted
Wardell-Johnson G W	Senior Research Scientists	Reclassified

Appendix 13 Department's Safety Record since 1960/61

Year	Hours Worked	No. of Accidents			Frequency Rate*			Days Lost
		Lost Time Accid.	Medical Treat. Accid.	Total	Lost Time Accid.	Medical Treat. Accid.	Both	
1960-61]		188			140			3 015
1961-62]		188			142			2 516
1962-63]		200			154			2 763
1963-64]	x)	172	x)		135	x)		2 498
1964-65]		181			153			3 700
1965-66]		179			144			2 455
1966-67]		185			100			3 244
1967-68	1 895 600	124	312	436	65	164	230	1 701
1968-69	2 019 568	96	155	251	48	76	124	1 738
1969-70	1 901 020	70	129	199	37	67	104	721
1970-71	1 808 406	48	158	206	27	76	110	458
1971-72	1 728 577	45	112	157	26	64	90	414
1973-74	1 651 621	45	119	164	27	72	99	359
1974-75	1 748 219	55	127	182	31	72	104	634
1975-76	1 762 693	31	113	144	17.5	64	82	383
1976-77	1 707 635	32	157	189	19	92	111	620
1977-78	1 764 519	26	151	177	15	86	100	731
1978-79	1 835 917	44	143	187	24	76	100	810
1979-80	1 826 452	32	125	157	17.5	68	86	983
1980-81	1 897 463	24	135	159	13	71	84	490
1981-82	1 915 684	19	141	160	10	74	84	450
1982-83	1 931 192	27	134	161	14	69	83	849
1983-84	2 144 995	43	198	241	20	92	112	819
1984-85	2 093 453	30	189	219	14	90	105	776
1985-86	2 649 390	41	204	245	15	77	92	1 477
1986-87	2 505 789	28	127	155	11	50	61	1 382
1987-88	2 500 935	34	118	152	13	47	60	590
1988-89	2 502 079	43	132	175	17	52	69	939
1989-90	2 393 040	37	115	152	15	48	63	1173xx)

x) Data not available.
xx) Of the 1173 days lost, 663 were carried over from 10 accidents sustained during the previous year.

Appendix 14 Publications Produced in 1989/90

Annual Report

Department of Conservation and Land Management 1988/89.

Landscape

Volume 5 No. 1
Spring 1989

In Perspective
Bush Telegraph
Island Interludes
The Dawesville Dilemma
Rising from the Ashes
Still Waters Run
Tree Killer
A Stately Collection
Putting Down Roots
Photo Essay
Urban Antics

Volume 5 No. 2
Summer 1989/90

In Perspective
Bush Telegraph
Shore Survivors
Ancient Land
Desert Big Foot
Endangered
Living Limestone
Unravelling the Mysteries of Verticordia
Shooting from the Stars
Photo Essay - Rainbow Desert
Blazing Computers
Rocks of Ages
Urban Antics

Volume 5 No. 3
Autumn 1990

In Perspective
Bush Telegraph
Desert Dreaming
Swamped with Birds
Where the Shore Meets the Sea
Endangered
Seasoned with Fire
Trappings of Success
Back from the Brink
Island of Bush, Sea of Wheat
Under Fire
A Question of Breeding
Urban Antics

Volume 5 No. 4
Winter 1990

In Perspective
Bush Telegraph
Endangered
Taking the Plunge
Numbat Dawn

Seaweed - The Good, the Bad and the Ugly?
Lightning Strike
To Fly like a Bird
Alluring Birds
Haven in the Heart
Taking Wood to Water
Land of the Big Water
Chip of the Old Block
Urban Antics

Calm News

11 monthly editions
1 Arbor Day Special

Saleable Books

Finding the Magic
Western Australia's Endangered Flora

Recreation

Information Booklet "The 4 Aces"
Bungle Bungle National Park
Badgingarra Nature Trail
Blackwood Valley
Moora Wildflower Drive R.C.C.
Cape Range National Park - Charles Knife
Mundaring District Bushwalks
Nuyts Wilderness
Western Australia's National Parks
National Park Comment Card
Kalbarri National Park
Yanchep National Park
Cage in the Bush - No. 16 POW Camp Marrinup
Geikie Gorge Boat Tour Ticket
Dwellingup and Lane Poole Reserve
Pemberton Bush Walks
Cape Arid and Eucla National Parks
Parks of the Coral Coast
Hill Springs
The South Coast Region
Wide Roadside Flora Drives R.C.C.
Kimberley - Visitor Information Newsletter
Coorow Shire - Lesueur Area Wildflower Drives R.C.C.
Kulin Wheatbelt Wildflowers R.C.C.
Carnamah - Eneabba Wildflowers R.C.C.

Education

Yanchep National Park Activities Program
The Chuditch
Discovering the Mundaring Forest
Calling all Squirrels - Firewood
Why Have Marine Parks and Nature Reserves?
Addendum - Calling all Squirrels
A Guide to Some of the Common Eucalypts of the Goldfields
Arbor Day Sheet

Resource Notes

No. 21

Eucalypts of Perth

Advisory

John Forrest National Park Management Plan Information
Clean Your Machine - Bumper Sticker
Winter Firewood
Dryandra Forest Management Plan Information
Roadside Conservation Committee
Native Trees of Dryandra
Vegetation and Tree Planting Advisory Service
Fire Wood Competition Form
1989 Avon Descent - Public Information
Improving the Flow of Traffic John Forrest National Park
The Wheatbelt - Trees for Rural Areas
The South West - Trees for Rural Areas
Your Window to the Swan Coastal Plain - Yanchep National Park
Thief Risk Area
Geikie Gorge Day Use
Shark Bay and Hamelin Pool Management
Duck Shooters Guide 1990
Recognize Sirex Wood Wasp in Western Australia
Grow Trees for Profit

Information Sheets

No. 2-89

Protecting Our Flora

No. 1-90

Aviary Birds

Industry

Valwood New Wood
Log Faults
Investment Opportunities in the Albany Region of Western Australia
The Australian Forestry and Forest Products Industry - Potential,
Constraints and Future

Posters

Arbor Day 1990

Management Plans

Yanchep National Park
Ningaloo Marine Park
Waroona Reservoir and Catchment Area; Summary of Submissions
Logue Brook - Reservoir and Catchment Area; Summary of Submissions
Walpole - Nornalup National Park
Leeuwin - Naturalist - Summary of Submissions
Dampier Archipelago; Summary of Submissions

Wildlife Management Program

No. 4

Eucalyptus rhodantha

No. 5

Declared Rare Flora and Other Plants in need of Special Protection
in the Northern Forest Region

Research Bulletin

No. 3

Jarrah Dieback: The dynamics and management of *Phytophthora
cinnamomi* in the jarrah (*Eucalyptus marginata*) forest of
south-western Australia

Technical Reports

No. 23

Search for Rufous-Hare Wallaby in Great Sandy and Little
Sandy Deserts

No. 24

The Flora and Fauna of Vacant Crown Land at White Well,
Shire of Dalwallinu, WA

CALM Briefing Paper

4-89

Workers Compensation

1-90

Tree Felling in the Shannon River National Park

2-90

Timber Royalties

Wood Utilization Research Centre Reports and Newsletters

Technical Report No. 7

Regrowth jarrah stockpile and sawmilling trial.

Technical Report No. 8

Sawmilling of regrowth karri logs.

Technical Report No. 9

Effect of sapstaining and C.C.A. treatment on strength
properties of radiata pine poles.

Technical Report No. 10

Veneers from regrowth jarrah.

Technical Report No. 11

Furniture manufacturing in Italy - a study tour.

Technical Report No. 12

Evaluation of milling equipment suitable for production
of VALWOOD feedstock.

Technical Report No. 13

Sawmilling study of Tasmanian blue gum grown in Western
Australia.

Technical Report No. 14

Comparison of low and high pressure watering systems for
stockpiling regrowth jarrah logs.

Technical Report No. 15

Debarking small diameter logs using a mobile chain flail
debarker.

Technical Report No. 16

Drying and grading marri boards.

Technical Report No. 17

Sawmilling study of rose gum.

Report No. 10

Effect of pencilling and furnace oil treatment on strength
properties of jarrah.

Report No. 11

The Wickepin fence post trial after 57 years of service.

Report No. 12

Adhesives for manufacture of furniture blanks.

Report No. 13

Shrinkage, collapse and dimensional recovery of regrowth
jarrah.

Report No. 14

Drying 25mm boards milled from regrowth jarrah logs.

WURC News

Furniture from forests.

WURC News

Developing VALWOOD.

WURC Information Sheet

Pine as a building material.

Occasional Papers

2-89

Australian and New Zealand Islands: Nature Conservation
Values and Management

Landnote

2-89

Summary of the Vertebrate Fauna Records of the Dragon Rocks
Nature Reserve

Herbarium Publications

NUYTSIA Vol. 7 No. 1 (Editor - N Lander)

NUYTSIA Vol. 7 No. 2 (Editor - N Lander)

KINGIA Vol. 1 No. 2

KINGIA Vol. 1 No. 3

Volunteer News

June 1990

Other Publications

Declared Rare Flora - Management Workshop - Abstracts
Roadside Conservation Committee Letterheads.
C.E. Lane - Poole Memorial Trust - Study Tour
CALM Alert (8 issues)
Goldfields Regional Note Paper
Guidelines for the Clearing and Maintenance of Roadside
Vegetation By Local Government R.C.C.
CALM - Regional and District Directory
Amendment to WA National Parks and Forests Brochure
Zoning for National Parks in Western Australia
CE Lane - Poole Memorial Trust
CALM Research Plan 1989/1990
A Stately Collection - WA Herbarium
Bibbulmun Walk 1989 - Certificate
Crown of Thorns - Coral Reef Assessment Form
Midge Notes November 89
Manual of Hardwood Logging Specifications
Tree Killer - Fight Against Dieback
Staff Training and Development Manual 1990
National Park Rangers and CALM - 5 Years of Progress
CALM Publications Catalogue
Aboriginal Employment and Training Plan
RAMSAR Convention 1990 - List of Wetlands
Valwood - Sows' Ears Into Silk Purses
Resources Directory - Marine
Radiata Pine in the Blackwood Valley
Blackwood Conference - Briefing Notes
Endangered Poison Plants of Western Australia
Career Information
The CALM Corporate Executive - Strategic Plan 1990/91
Subsistence Hunting, Fishing and Gathering Rights of Native
People in the USA and USSR
Field Cadet - Graduation Ceremony
Dreaming of a Future - A Unique Program to Reintroduce
Endangered Mammals to the Gibson Desert
Endangered Mammal Project - Funding Requirements
CALM Interim Communications Plan - Relocation of Endangered
Mammals in the Gibson Desert Nature Reserve
Tree Decline and Revegetation - Newsletter
CALM Appreciation Certificate

CALM Appreciation Certificate for Voluntary Service
Submission to Resource Assessment Commission
CALM Accounting Manual
Environment Week Leaflet
Rebuilding the Cathedral
CALM in the Wheatbelt
To a Friend of the Trees Certificate

Scientific and Technical Publications - External Refereed Journals

- Abbott, I. (1989). The influence of fauna on soil structure.
In "Animals in Primary Succession - The Role of Fauna in Reclaimed Lands" (ed. J.D. Majer), pp. 39-50. University Press, Cambridge.
- Bartle, J.R. (1989). Eucalypt Pulpwood: A potential new crop for farmers in the lower south-west. In 'Trees - Everybody Profits'. Proc Seminar AIAS. Occas. Paper Dept Agriculture 45:41-51.
- Burbidge, A.A., Hopper, S.D. and van Leeuwen, S. (eds) (1990) Nature conservation, landscape and recreational values of the Lesueur Area. Environmental Protection Authority Bulletin 424., E.P.A., Perth.
- Burbidge, A.A. and McKenzie, N.L. (1989). Patterns in the modern decline of Western Australia's vertebrate fauna: causes and conservation implications. Biol. Cons. 50: 143-98.
- Christensen, P. and Abbott, I. (1989). Impact of fire in the eucalypt forest ecosystem of southern Western Australia: a critical review. Aust. Forestry 52:103-121.
- Coates, D.J., and Hnatiuk, R.J. (1990). Systematic and evolutionary inferences from isozyme studies in the genus *Eremaea* (Myrtaceae). Aust. Syst. Bot. 3: 59-74
- Coates, D.J. and Sokolowski, R.E. (1989). Geographic patterns of genetic diversity in Karri (*Eucalyptus diversicolor*) F. Muell. Aust. J. Bot. 37: 145-156.
- Cowan, R.S. and Maslin, B.R. (1990). *Acacia* Miscellany 1. Some oligoneurous species of *Acacia* (Leguminosae: Mimosoideae: Section *Plurinerves*) from Western Australia. Nuytsia 7:183-199.
- Cowan, R.S. and Maslin, B.R. (1990). *Acacia* Miscellany 2. Species related to *A. deltoidea* (Leguminosae: Mimosoideae: section *Plurinerves*). Nuytsia 7:201-208.
- Cowan, R.S. and Maslin, B.R. (1990). *Acacia* Miscellany 3. Some new microncurous taxa of Western Australia related to *A. multilineata* (Leguminosae: Mimosoideae: Section *Plurinerves*). Nuytsia 7:209-219.
- Curry, S. and Maslin, B.R. (1990). Cunningham's collecting localities while botanist on Lieutenant Phillip Parker King's survey of coastal Australia, December 1817 to April 1822. In Short, P.S. (ed.), History of systematic botany in Australasia, pp. 137-148. Publ. Australian Systematic Botany Society.
- Davison, E.M. and Tay, F.C.S. (1989). Phenology of *Eucalyptus marginata* on sites infested with *Phytophthora cinnamomi*. Australian Journal of Botany 37:193-206.
- Friend, J.A. (1989). Mymecobiidae. Chapter 22. In "Fauna of Australia. Volume 1B. Mammalia" (ed. D. Walton). Pp. 583-90. Bureau of Flora and Fauna, Canberra.
- Friend, G.R. and Collier, K.M. (1990). Wetland herptofauna of Kakadu National Park, Australia: seasonal richness trends, habitat preferences and the effects of feral ungulates. J. Trop. Ecol. (1990) 6:131-152.

- Gibson, N. and Kirkpatrick, J.B. (1989). Effects of the cessation of grazing on the grasslands and grassy woodlands of the Central Plateau, Tasmania. *Australian Journal of Botany* 37: 55-63.
- Halse, S.A. and Jaensch, R.P. (1989). Breeding seasons of waterbirds in south-Western Australia - the importance of rainfall. *Emu* 89, 232-249.
- Hopkins, A.J.M. & Griffin, E.A. (1989). Fire in the *Banksia* woodlands of the Swan Coastal Plain. *J. Roy. Soc. Western Australia* 71:93-94.
- Hopper, S.D. and Burbidge, A.H. (1989). Conservation status of *Banksia* woodlands on the Swan Coastal Plain. *Journal of the Royal Society of Western Australia* 71: 115-116.
- Hopper, S.D. and Coates, D.J. (1990). Conservation of genetic resources in Australia's Flora and Fauna. *Proc. Ecol. Soc. Aust.*, 16: 567-577.
- Inions, G. Classification and evaluation of sites in karri (*Eucalyptus diversicolor*) regeneration. I. Edaphic and climatic attributes. *For. Ecol. Manage.* 32: 117-134.
- Inions, G., Wardell-Johnson, G. and Annels, A. (1990). Classification and evaluation of sites in Karri (*Eucalyptus diversicolor*) regeneration, II. Floristic attributes. *For. Ecol. Manage.* 32: 135-154.
- Keighery, G.J. (1989). *Banksia* woodland weeds *Journ. Roy. Soc. Western Australia*. 71: 111-112.
- Keighery, G.J. (1990). Taxonomy of the *Grevillea brachystylis* species complex (Proteaceae). *Nuytsia* 7: 125-131.
- Keighery, G.J. (1990). *Caesia viscida*, a new species of Antheriacaceae (Liliaceae s. lat.) from south-western Australia. *Nuytsia* 7: 133-135.
- Keighery, G.J. (1990). *Patersonia spirifolia* (Iridaceae), a new species from south-western Australia. *Nuytsia* 7: 137-139.
- Kenneally, K.F. (1990). Checklist of Vascular Plants of the Kimberley, Western Australia. W.A. Naturalist Club Handbook 14.
- Lander, N.S. (1989). Taxonomy of *Olearia stuartii* (Asteraceae: Astereae) and allied species. *Nuytsia* 7:25-35.
- Lander, N.S. (1989). *Taplinia*, a new genus of Asteraceae (Inulcae) from Western Australia. *Nuytsia* 7:37-42.
- Lander, N.S. and Walsh N.G. (1989). *Olearia astroloba* (Asteraceae: Astereae), a new species endemic to Victoria. *Muelleria* 7:117-121.
- Lander, N.S. (1989). *Olearia archeri* (Asteraceae: Astereae), a new name for a familiar species from Tasmania. *Muelleria* 7:117-121.
- Lander, N.S. (1989). The Tasmanian plant collecting localities of Ronald Gunn and Joseph Milligan - additional records. *Austral. Syst. Bot. Soc. Newsletter* 57:7-10.
- Lander, N.S. (1989). *Apostates* (Asteraceae: Astereae), a new genus from the south-eastern Polynesian island of Rapa. *Austral. Syst. Bot.* 2:129-33.
- Lander, N.S. (1990). New species of *Olearia* (Asteraceae: Astereae) endemic to Western Australia. *Nuytsia* 7:141-159.
- Marchant, N.G. (1990). The contribution of the Russian botanist Turczaninov to Australian plant taxonomy pp. 121-130 In Short, P.S. (ed.) *History of systematic botany in Australasia*, Australian Systematic Botany Society, Melbourne.
- Marchant, N.G. (1990). The Western Australian collecting localities of J.A.L. Preiss. In Short, P.S. (ed.) *History of systematic botany in Australasia*. pp. 131:135 Australian Systematic Botany Society, Melbourne.
- Marchant, N.G. (1989). Sargent, Oswald Hewlett 1880-1952. In Searle, G.

- (ed.) Australian Dictionary of Biography, vol. 11 pp. 523.
Melbourne University Press, Melbourne.
- Maslin, B.R. (1989). *Acacia veronica* Maslin (Leguminosae:Mimosoideae), a new species of *Acacia* endemic in the Stirling Range, Western Australia. *Nuytsia* 7:43-47.
- Maslin, B.R. and Court, A.B. (1989). *Acacia caeruleascens*, a new species of *Acacia* section Phyllodineae from Victoria. *Muelleria* 7:131-134.
- Maslin, B.R. (1990). *Acacia* Miscellany 4. Three new Western Australian species with affinities to *A. wilhelmiana* (Leguminosae: Mimosoideae: section *Plurinerves*) from Western Australia. *Nuytsia* 7:221-228.
- Mattinson, B., Morrison, D. and Eckersley, P. (1989). The economics of tree farming in the south-west of Western Australia. In 'Trees - Everybody Profits'. Proc. Seminar. AIAS Occas. Paper Dept Agriculture 45:70-83.
- McGrath, J.F. and McArthur, S.L. (1990). Influence of Fertilizer Timing on Seasonal Nutrient uptake and Dry-Matter Production by Young *Pinus radiata* in southern Western Australia. *Forest Ecology and Management*. 30:259-269.
- McKenzie, N.L., Belbin, L., Margules, C.R. and Keighery, G.J. (1989). Selecting Representative Reserve Systems in Remote Areas: A Case Study in the Nullarbor Region, Australia. *Biological Conservation* 50: 239-261.
- Moore, R.W.W., (1989). Agroforestry with widely spaced trees. In 'Trees - Everybody Profits'. Proc. Seminar AIAS. Occas. Paper Dept Agriculture 45:55-65.
- Nagy, K.A., Bradley, A.J. and Morris, K.D. (1990). Field metabolic rates, water fluxes and feeding rates of Quokkas, *Setonix brachyurus* and Tammars, *Macropus eugenii* in Western Australia. *Aust. J. Zool.* 37: 533-60.
- Pearson, D.J. (1989). The diet of the Rufous Hare-wallaby (Marsupialia: Macropodidae) in the Tanami Desert. *Aust. Wildl. Res.* 16:527-535.
- Ritson, P., and Pettit, N.E. (1989). Salt and water Movement in Single and Double ridge mounds. Report No. WS45 Water Authority of Western Australia.
- Ritson, P., and Pettit, N.E. (1989). Mounding for Tree Establishment in Saline Seeps. *Land and Water Research News Issue 2*:17-18.
- Ritson, P., and Pettit, N.E. (1989). Seedling containers and Mulching for Tree Establishment in Saline Seeps. *Land and Water Research News Issue 3* (2pp).
- Roberts, J.D., Wardell-Johnson, G.W. and Barendse, W. (1990). Extended descriptions of *Geocrinia vitellina* and *Geocrinia alba* (ANURA: Myobatrachidae) from south western Australia, with comments on the status of *G. lutea*. *Rec. West. Aust. Mus.* 14(4): 427-37.
- Sampson, J.F., Hopper, S.D. and James, S.H. (1989). The mating system and population genetic structure in a bird-pollinated mallee, *Eucalyptus rhodantha*. *Heredity* 63, 383-393.
- Schofield, N.J., Loh, I.C., Scott, P.R., Bartle, J.R., Ritson, P., Bell, R.W., Borg, H., Anson, B. and Moore, R., (1989). Vegetation strategies to reduce stream salinities of water resource catchments in south-west Western Australia. Water Authority of Western Australia Report No. WS33 (82pp).
- Seigler, D.S., Maslin, B.R. and Conn, E.F. (1988). Cyanogenesis in the Fabaceae. In Stirton, C.H. & Zarucchi, J.L. (eds), *Advances in Legume Biology, Monogr. Syst. Bot. Missouri Bot. Gard.* 29:645-672.
- Shearer, B.L. and Hill, T.C. (1989). Diseases of *Banksia* woodlands on the Bassendean and Spearwood Dune systems. *Journal of the Royal Society of Western Australia* 71:113-114.

- Short, P.S. and Wilson, P.G. (1990). Macgick, a new genus of the Australian (Inleae:Graphaliinae), with notes on the genus *Epaltes* Cass. - *Muelleria* 7:259-265.
- Start, A.N. and Morris, K.D. (1989). White-breasted form of the Wedge-tailed Shearwater off the Pilbara coast. *West. Aust. Nat.* 18:61.
- Tippett, J.T., McGrath, J.F. and Hill, T.C. (1989). Site and Seasonal effects on susceptibility of *Eucalyptus marginata* to *Phytophthora cinnamomi*. *Australian Journal of Botany* 37:481-490.
- Wardell-Johnson, G.W., Inions, G. and Annels, A. (1989). A floristic survey of the Walpole-Nornalup National Park, Western Australia. *For. Ecol. Manage.* 28: 259-79.
- Wheeler, J.R. (1989). *Hibberia hooglandii*, a new species from the Kimberley Region. Western Australia. *Nuytsia* 7:69-73.
- Wilson, P.G. (1989). A revision of the genus *Hyalobpenna* (Acteraceae: Inleae:Gnaphaliinae) - *Nuytsia* 7:75-101.
- Wilson, P.G. (1989). *Erymophyllum* (Asterceae:Inuleae:Gnaphaliinae) a new Australian genus in the *Helipterum* complex *Nuytsia* 7:103-116.

Other Scientific and Technical Reports

- Burrows, N., Ward, B., Maisy, K. and Robinson, A. (1989). Fire history survey of Plumridge Lakes Nature Reserve (Internal report).
- Burrows, N., Ward, B., Maisy, K. and Robinson, A. (1989). Fire history survey of Neales Junction Nature Reserve (Internal report).
- Burrows, N. (1990). Report on fire management in State forests (Internal report).
- Hill, T.C.J. and Tippett, J.T. (1989). Comparison of three methods for the eradication of *Phytophthora cinnamomi* from deep leached sands. Report for the Roadside Conservation Committee.
- McCaw, W.L., (1990). Chaining of buffer strips in National Parks and Nature Reserves: an ecological perspective (Internal report).
- McCaw, W.L., Neal, J. and Smith, R. (1989). Shrubland fire studies in the Stirling Range National Park (Internal report).
- McGrath, J.F., Ward, D.J., and Davison, E.M. (1990). Pine Deaths in the Blackwood Valley Plantations: a Recurrent Problem. Internal Report.
- Moore, R.W. (1989). Agroforestry for profit. In: Proceedings of the third Agroforestry Conference Morwell Vic. pp 18-34.
- Patrick, S.J. (1989). Guide to the establishment and maintenance of field herbaria. CALM, Como.

Appendix 15 Licences Issued in 1989/90

Fauna Licences	Licences Issued	Fauna Licences	Licences Issued
<u>SCIENTIFIC</u>	115	<u>KANGAROOS</u>	
<u>EDUCATION & PUBLIC</u> (to take)(Reg 15)		Purpose:	
Purpose:		Take kangaroos for sale	151
Care of derelict fauna	1	Deal in carcasses	22
Collection and study	4	Deal in skins	12
Display and study	9	Process	18
Education	7	EXPORTS - Interstate	
Photography	32	SPECIES	Number
Miscellaneous	70	<u>BIRDS</u>	
<u>EDUCATION & PUBLIC</u> (to hold)(Reg 16)	<u>72</u>	<u>Finches:</u>	
<u>AVIAN FAUNA</u>		Crimson (Blood)	50
Purpose:		Blue-faced Finch	12
Keep and breed in captivity (Reg 12)	5752	Long-tailed (Blackheart)	257
Deal (Reg 13)	89	Pictorella	11
Breed for Commercial Purposes (Reg 14)	2	Banded (Double-bar)	1
Trap (Reg 11)	3	Gouldian	2
Species Trapped: No.		Red-eared Firetail	9
Western Rosella	1080	Masked	24
Western King Parrot	736	<u>Parrots:</u>	
Twenty Eight Parrot	1434	Cloncurry	3
Galah	45	Mallee Ringneck	2
<u>FAUNA</u>		Port Lincoln Ringneck (Twenty Eight)	1269
Purpose:		Red-capped (WA King)	583
Keep in captivity (Reg 12A)	97	Elegant	49
<u>EMUS</u>		Rock	28
Purpose:		Mulga	8
Emu farming (Reg 14)	17	Regent	91
Dealing (Emu eggshells Reg 13)	24	Turquoise	2
<u>CROCODILE</u>		Weero (Cockatiel)	45
Purpose:		Galah	45
Crocodile farming (Reg 14)	1	Australian King	13
<u>GAME</u>		Hooded	43
Duck	3301	Major Mitchell	6
Quail	75	Eclectus	2
		Superb	9
		Scarlet-chested	5
		Golden-shouldered	5
		Alexandra's (Princess)	24
		Red-winged	5
		Red-rumped	11
		Little Corella	31

SPECIES	Number	SPECIES	Number
Long-billed Corella	6	<u>Reptiles</u>	
Red-tailed Black Cockatoo	21	Carpet Python	3
Baudin's White-tailed Black Cockatoo	6	Black-headed Python	2
Glossy Black Cockatoo	2	Children's Python	4
Sulphur-crested Cockatoo	4	Olive Python	1
Western Rosella	804	Tiger Snake	10
Northern Rosella	3	Gwardar	2
Green Rosella	1	Taipan	1
Eastern Rosella	7	Dugite	12
Pale-headed Rosella	2	Common (Southern) Death-adder	1
Crimson Rosella	1	Northern Death-adder	4
Rainbow Lorikeet	2	Desert Death-adder	2
Purple-crowned Lorikeet	12	Freshwater (Johnston) Crocodile	1
Red-collared Lorikeet	4	Chelonia depressa	6
Varied Lorikeet	5	Reticulated Velvet Gecko	10
Scaly-breasted Lorikeet	1		
Red-vented Blue Bonnet	5	<u>Amphibians</u>	
<u>Other Species:</u>		Shoemaker Frog	6
Red Plumed Pigeon	15	Neobatrachus fulvus	27
Great Knot	6		
Painted Button-quail	9	<u>Other</u>	
Red-chested Button-quail	4	Red Kangaroo (skins)	58 945
Black Kite	2	Western Grey Kangaroo (skins)	30 991
Barn Owl	2	Euro (skins)	9 555
Large Sand Plover	10	Emu (eggs)	82
Mongolian Plover	3	Emu (skins)	42
Red-capped Plover	1	Emu (litres of oil)	2
Southern Cassowary	2	Emu (kg of meat)	148
Emu	116	Emu (kg of feathers)	7
Oriental Pranticole	1	Emu (products)	23
Ruddy Turnstone	2	Estuarine (Saltwater) Crocodile (skins)	4
Broad-billed Sandpiper	1	New Guinea Crocodile (skins)	4
Curlew Sandpiper	4	Australian Owlet Nightjar (specimen)	1
Terek Sandpiper	4	Ctenophorus clayi	2
Red-necked Stint	8	Ctenophorus cristatus	4
Bar-tailed Godwit	3	Ctenophorus inermis	4
Grey-tailed Tattler	18	Ctenophorus maculatus	42
<u>Mammals</u>		Ctenophorus norrisi	5
Euro	10	Ctenophorus ornatus	26
Western Grey Kangaroo	3	Ctenophorus pictus	2
Red Kangaroo	11	Ctenophorus reticulatus	5
Agile Wallaby	1	Ctenophorus salinarum	1
Tammar Wallaby	40	Ctenophorus scutulatus	5
Black-footed Rock-wallaby	2	Pogona minor	2
Bush Rat	22	Pogona minor minor	4
		Pogona minor minima	5
		Tympanocryptis adelaidensis	4
		Tympanocryptis parviceps	6
		Mulga Snake	1
		Dugite	1
		Gwardar	9

**Fauna
Licences**

SPECIES	Number
Jan's Banded Snake	1
Crenadactylus ocellatus	7
Diplodactylus sp.	4
Diplodactylus granariensis	1
Diplodactylus maini	4
Gehyra sp.	14
Gehyra purpurascens	7
Tree Diella	86
Bynoe's Gecko	49
Reticulated Velvet Gecko	60
Phyllodactylus marmoratus	1
Thick-tailed Gecko (specimen)	5
Delma sp.	3
Delma australis	3
Delma fraseri	8
Burton's Snake Lizard	1
Pygopus lepidopodus	2
Cryptoblepharus sp.	1
Cryptoblepharus plagiocephalus (specimen)	2
Ctenotus sp. (specimen)	8
Ctenotus atlas	1
Ctenotus regius	1
Ctenotus schomburgkii	3
Egernia carinata	1
Egernia depressa	1
Hemiernis initialis	82
Hemiernis peronii	3
Leiopisma trilineatum	3
Lerista sp.	26
Lerista connivens	4
Lerista distinguenda	7
Lerista dorsalis	22
Lerista gerrardii	50
Lerista lineopunctulata	78
Lerista macropisthopus	20
Lerista muelleri	59
Lerista nichollsi	11
Lerista petersoni	30
Lerista picturata	155
Lerista planiventralis	14
Lerista praepedita	3
Lerista stictopleura	51
Lerista uniduo	25
Menetia greyii	54
Morethia adelaidensis	2
Morethia butleri	13
Morethia lineocellata	2
Morethia obscura	82
Omolepida branchialis	2
Bobtail Skink	9
Ramphotyphlops australis	1
Ramphotyphlops hamatus	1
Gould's Monitor	2

**Fauna
Licences**

SPECIES	Number
Varanus gilleni (specimen)	1
Varanus rosenbergi	2
Varanus tristis	1
Black-faced Woodswallow	1
Major Mitchell Cockatoo	2
Galah	9
Long-billed Corella	2
Carnaby's White-tailed Black Cockatoo	4
Common Bronzewing	3
Torresian Crow	2
Banded Honeyeater	2
Singing Honeyeater (specimen)	2
Rufous Whistler	2
Scarlet Robin	1
Spotted Bowerbird	4
Port Lincoln Ringneck	quantity
Little Shearwater	1
Australian Crane	1
Grey-crowned Babbler	159
Lesser Wart-nosed Horseshoe Bat	5
Little Mastiff-bat	3
Beccari's Mastiff-bat	2
Warabi	2
Common Rock-rat	1
Scaly-tailed Possum	1
Gould's Wattled Bat	15
Chocolate Wattled Bat	1
Hoary Bat	6
Yellow-lipped Eptesicus	5
Eptesicus finlaysoni	1
Little Forest Eptesicus	10
Common Bent-wing Bat	1
Large-footed Mouse-eared Bat	1
Arnhem Land Long-eared Bat	1
North Queensland Long-eared Bat	5
Lesser Long-eared Bat	17
Greater Long-eared Bat	2
Pygmy Long-eared Bat	6
Western Broad-nosed Bat	15
Little Broad-nosed Bat	15

EXPORTS - Overseas - subject to ANPWS permit

Birds

Blue-winged Kookaburra	1
Galah	23
Little Corella	1

**Fauna
Licences**

SPECIES	Number
Birds	
Long-billed Corella	2
Red-collared Lorikeet	4
Sulphur-crested Cockatoo	4
Mammals	
Carpentarian Dunnart (specimen)	2
Stripe-faced Dunnart	2
Yellow-bellied Sheathtail	2
Bat	
Common Sheathtail Bat	9
Ghost Bat	3
Northern Mastiff-bat	1
Beccari's Mastiff-bat	4
Western Chestnut Mouse	1
Pale Field-rat (specimen)	4
Common Rock-rat	5
Little Red Flying-fox	11
Gould's Wattled Bat	4
Hoary Bat	8
Little Cave Eptesicus	4
Common Bent-wing Bat	2
Large-footed Mouse-eared Bat	2
Arnhem Land Long-eared Bat	1
Lesser Long-eared Bat	3
Western Broad-nosed Bat	24
Little Broad-nosed Bat	10
Timor Pipistrelle	1
Amphibians	
Neobatrachus fulvus	6
Neobatrachus kunapalari	9
Humming Frog	45
Shoemaker Frog	5
Goldfields Bull Frog	7
Gunther's Toadlet	1
Uperoleia glandulosa	1
Uperoleia russelli	1
Reptiles	
Trachydosaurus rugosus	3
Others	
Red Kangaroo (skins)	221 810
Western Grey Kangaroo (skins)	10 090

**Fauna
Licences**

SPECIES	Number
Eastern Grey Kangaroo (skins)	30
Red Kangaroo (meat tonnes)	115
Emu (skins)	62
Emu (eggs)	180
Emu (oil litres)	4
IMPORTS - Interstate	
Birds	
<u>Finches:</u>	
Star	70
Gouldian	428
Blue-faced	6
Long-tailed (Blackheart)	10
Banded (Double-bar)	278
Plum-headed	3
Black-throated	25
Crimson (Blood)	41
Chestnut-breasted	98
Painted Firetail	300
Yellow-rumped	4
<u>Parrots:</u>	
Budgerigar	1
Galah	1103
Mulga	10
Mallee Ringneck	18
Port Lincoln Ringneck	1
Hooded	31
Elegant	2
Blue-winged	13
Alexandra's (Princess)	90
Blue-bonnet	69
Naretha (Little) Blue-bonnet	6
Weero (Cockatiel)	37
Australian King	131
Regent	17
Red-rumped	94
Turquoise	99
Gang Gang	24
Scarlet-chested	320
Superb	46
Bourke	244
Major Mitchell	37
Golden-shouldered	12
Red-winged	112
Eclectus	7
Long-billed Corella	80
Little Corella	389

**Fauna
Licences**

SPECIES	Number
Birds	
<u>Parrots:</u>	
Sulphur-crested Cockatoo	20
Glossy Black Cockatoo	4
Red-tailed Black Cockatoo	9
Western Rosella	4
Adelaide Rosella	11
Crimson Rosella	187
Yellow Rosella	37
Eastern Rosella	140
Northern Rosella	1
Pale-headed Rosella	94
Green Rosella	1
Scaly-breasted Lorikeet	80
Rainbow Lorikeet	170
Varied Lorikeet	16
Little Lorikeet	13
Musk Lorikeet	12
Red-collared Lorikeet	25

Other Species:

Black-breasted Button-quail	10
Red-backed Button-quail	2
Red-checked Button-quail	2
Brahminy Kite	2
Black Kite	1
Grey Goshawk	1
Pacific Baza	4
Osprey	1
White-bellied Sea-Eagle	1
Blue-winged Kookaburra	1
Brown Falcon	2
Australian Kestrel	1
Eastern Grass-owl	3
Maggie Goose	2
Black Swan	3
Wandering Whistling-duck	12
Green Pygmy-goose	4
Radjah Shelduck	2
Cattle Egret	26
White-faced Heron	17
Bush Thick-knee	3
Banded Lapwing	2
Black-necked Stork (Jabiru)	2
Green-winged Pigeon	14
White-headed Pigeon	8
Diamond Dove	8
Brush Bronzewing	8
Flock Pigeon	2
Southern Cassowary	2

**Fauna
Licences**

SPECIES	Number
Birds	
<u>Other Species:</u>	
Emu	125
Emu Eggs	141
Australian Brush Turkey	8
Mallee Fowl	4
Spotted Bower-bird	3
Buff-banded Rail	10
Shining Starling	4

Exotics:

Nyassa Lovebird	37
Peach-faced Lovebird	245
Fischer's Lovebird	8
Masked Lovebird	119
Rose-ringed Parakeet	24
Red-fronted Parakeet	60
Yellow-fronted Parakeet	46
Blossom-headed Parakeet	5
Alexandrine Parakeet	6
Quaker Parrot	12
Sun Conure	10
Red-faced Parrot-finch	4
Strawberry Finch	16
Cutthroat Finch	21
Cuban Finch	41
Melba Finch	125
Jacarini Finch	20
Aurora Finch	87
Red-headed Finch	16
African Firefinch	90
Cordon Bleu	76
Magpie Mannikin	4
White-headed Munia	6
White-backed Munia	6
Waxbill	54
Orange-cheeked Waxbill	62
Golden-breasted Waxbill	123
Peafowl	12
Green Peafowl	12
Ruddy Ground Dove	6
White-breasted Ground Dove	2
Namaqua Dove	30
Bleeding Heart Pigeon	2
Feral Pigeon	10
Lady Amherst Pheasant	6
Kalij Pheasant	2
Swinhoe Pheasant	3
Ringneck Pheasant	2
Reeve's Pheasant	20

Fauna Licences

SPECIES	Number
<u>Exotics:</u>	
Golden Pheasant	2
Fire-backed Pheasant	2
Ruddy Shelduck	2
Mandarin Duck	2
Egyptian Goose	4
Paradise Shelduck	4
Hooded Siskin	4
Japanese Quail	26
<u>Mammals</u>	
Tasmanian Devil	3
Red Kangaroo	5
Western Grey Kangaroo	3
Euro	5
Agile Wallaby	1
Rufous Hare-wallaby	10
Yellow-footed Rock-wallaby	10
Greater Stick-nest Rat	40
Bush Rat	25
Southern Hairy-nosed Wombat	4
Common Wombat	1
<u>Reptiles</u>	
Estuarine (Saltwater) Crocodile	49
Black-headed Python	2
Children's Python	4
Carpet Python	2
Common (Southern) Death-adder	2
Northern Death-adder	4
Desert Death-adder	2
Western Tiger Snake	4
Taipan	2
Mulga Snake	2
Dugite	2
Gwardar	4
<u>Others:</u>	
Western Grey Kangaroo (meat tonnes)	21.2
Red Kangaroo (meat tonnes)	48.2
Eastern Grey Kangaroo (meat tonnes)	19.125
Eastern Grey Kangaroo (skins)	5 638
Red Kangaroo (carcasses)	18 150
Western Grey Kangaroo (skins)	278
Red Kangaroo (skins)	3 491
Euro (skins)	901

Fauna Licences

SPECIES	Number
<u>Others:</u>	
Euro (meat tonnes)	1
Euro (carcasses)	50
Western Grey Kangaroo (carcasses)	1348
Eastern Grey Kangaroo (skins)	700
New Guinea Crocodile (skins)	6
Estuarine (Saltwater) Crocodile (skins)	43
<u>Exotic:</u>	
Addax	4
Nyala	4
Kudu	2
Hog Deer	1
Red Deer	25
Ostrich	14
American Alligator	2
Grevy's Zebra	5
Cheetah	4
Rothschild's Giraffe	2
English Angora Rabbit	2
Square-lipped Rhinoceros	2
Brazilian Tapir	2

FLORA

During the twelve months ending 30 June 1990 the following licences were issued.

Commercial Purposes Licence:

- ° 1387 licences were issued authorising the taking of protected flora for sale from Crown land.

Commercial Producers Licence:

- ° 307 licences were issued authorising the taking of protected flora for sale from private land.

Scientific or Other Prescribed Purposes Licences:

- ° 1217 licences were issued authorising the taking of protected flora from Crown land for scientific, educational, hobby, propagation and personal enjoyment purposes. Holders of this licence are not permitted to sell flora taken.

Appendix 16 Open Seasons Declared in 1989/90

	Government Gazette
Parrot Control - Fruit Production Red-capped Parrot, Ringnecked Parrot and Western Rosella (various shires)	25.08.89
Bird Control - Primary Production Little Corella, Galah, Western Silvereye, Australian Raven, Australian Crow and Little Crow (various shires)	25.08.89
Bird Control - Threat to Wildlife Rainbow Lorikeet (South-West Land Division)	25.08.89
Waterfowl Hunting Season (Kimberley, Northwest and Eastern Land Divisions) 1 January 1990 to 31 December 1990	22.12.89
Waterfowl Hunting Season (South-West and Eucla Land Divisions) 14 January 1990 to 11 February 1990	22.12.89
Waterfowl Population Management (South-West and Eucla Land Divisions) Mountain Duck 1 January 1990 to 13 January 1990 12 February 1990 to 31 December 1990	22.12.89

Appendix 17

Offences Under the Wildlife Conservation Act

NO. OF OFFENCES X SECTION OF ACT	OFFENCE																								
67 x S16(1)	<p>Illegal Taking Of Protected Fauna</p> <table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">1 Gwardar</td> <td style="width: 50%;">1 Dugite</td> </tr> <tr> <td>2 Short-billed Corellas</td> <td>10 Galahs</td> </tr> <tr> <td>9 Freshwater Crocodiles</td> <td>9 Grey Kangaroos</td> </tr> <tr> <td>14 Red-eared Firetail</td> <td>1 Dolphin</td> </tr> <tr> <td>1 Grey Currawong</td> <td>1 Western Swamp Tortoise</td> </tr> <tr> <td>1 Star Finch</td> <td>1 Australian Wood Duck</td> </tr> <tr> <td>20 Wild Ducks</td> <td>2 Bridle Tern Eggs</td> </tr> <tr> <td>Gorgonian Coral</td> <td>5 Australian Shelduck</td> </tr> <tr> <td>1 Australian Raven</td> <td>Approx 228 White-tailed Black Cockatoos</td> </tr> <tr> <td>4 Western Rosellas</td> <td>4 Port Lincoln Ringnecks</td> </tr> <tr> <td>2 Coots</td> <td>3 Red Kangaroos</td> </tr> <tr> <td>2 Euro Kangaroos</td> <td></td> </tr> </table>	1 Gwardar	1 Dugite	2 Short-billed Corellas	10 Galahs	9 Freshwater Crocodiles	9 Grey Kangaroos	14 Red-eared Firetail	1 Dolphin	1 Grey Currawong	1 Western Swamp Tortoise	1 Star Finch	1 Australian Wood Duck	20 Wild Ducks	2 Bridle Tern Eggs	Gorgonian Coral	5 Australian Shelduck	1 Australian Raven	Approx 228 White-tailed Black Cockatoos	4 Western Rosellas	4 Port Lincoln Ringnecks	2 Coots	3 Red Kangaroos	2 Euro Kangaroos	
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2 x S16(2)	<p>Taking Fauna Contrary To The Provisions Of A Notice</p> <p>68 Red Kangaroos</p>																								
18 x S16A(1)	<p>Unlawful Possession Of Protected Fauna</p> <p>32 Galahs 4 Grey Kangaroos 2 White-tailed Black Cockatoos 6 Red-tailed Black Cockatoos 1 Echnida 1 Black-headed Python 3 Red Kangaroos 2 Euros</p>																								
4 x S16A(2)	<p>Possession Of Untagged Fauna</p> <p>68 Red Kangaroos 1 Grey Kangaroo</p>																								
1 x S17(2)(c)	<p>Illegal Importation Of Fauna</p> <p>8 European Goldfinches</p>																								
2 x S17(2)(d)	<p>Export Of Fauna Without A Licence</p> <p>(5kg Whale teeth)</p>																								

**NO. OF OFFENCES X
SECTION OF ACT**

OFFENCE

12 x S17(2)(e)

**Selling Fauna Or Taking Fauna For The Purpose Of Sale
Without Authority Of A Licence**

2 Dalgites
3 Galahs
9 Emu Chicks
1 Hawksbill Turtle Shell
3 Grey Kangaroo Paws
68 Red Kangaroos
6 Emu Eggs
5kg Whale teeth
24 Grey Kangaroos

1 x S17(3)(A)

Use Of Illegal Means Or Device In The Taking Of Fauna

1 Star Finch

40 x S23B(1)

Illegal Taking Of Protected Flora From Crown Land

Melaleuca viminea	Stirlingia latifolia
Banksia coccinea	Eucalyptus tetragona
Banksia grandis	Dryandra cuneata
Banksia baxteri	Calothomnus species
Dryandra polycephalla	Hakea pandanicarpa
Kunzea ericifolia	Verticordia monadelpha
Eucalyptus marginata	Eucalyptus calophylla
Grevillea diversifolia	Verticordia densiflora
Podocarpus drouynianus	Banksia repens
Melaleuca raphiophylla	Banksia petiolaris
Melaleuca spathulata	Verticordia nitens
Nymphaea violacea	Hakea cucullata
Nymphoides species	Aponogeton elongatus
Eriocaulon species	Eriocaulon setaceum
Agonis juniperina	

14 x S23D(1)(b)

**Taking Protected Flora Without Permission
Of The Owner/occupier Of The Land**

Kunzea ericifolia
Verticordia nitens
Eucalyptus marginata

3 x S23D(2)(a)

**Sold Protected Flora Taken From Private Land, Without
Authority Of A Licence**

Agonis linearifolia
Banksia coccinea
Boronia denticulata
Bossiae eriocarpa

NO. OF OFFENCES X SECTION OF ACT	OFFENCE
2 x S23E(1)(a)	Illegal Selling Of Protected Flora Agonis linerfolia
2 x S23E(1)(b)	Failed To Keep A Record Of Flora Purchased For Re-sale Boronia megastigma Crowea angustifolia Agonis parviceps Melaleuca viminea
3 x S23F(4)	Illegal Taking Of Declared Rare Flora Eucalyptus phylacis Stylidium plantagineum Chamalaucium sp. (South Coastal Plain)
2 x S25(1)(a)	Wilfully Misleading, Assaulting Or Resisting Wildlife Officer
2 x S25(1)(e)	Stating A False Name Or Address To A Wildlife Officer
1 x S25(1)(F)	Using Abusive Language To A Wildlife Officer
14 x S25(1)(g)	Failed To Observe The Conditions Of A Licence Issued Pursuant To The Provision Of This Act

WILDLIFE CONSERVATION REGULATIONS:

1 x R7(6)	Failing To Submit Returns As Required
1 x R12(7)(a)	Possession Of Avian Fauna, Of A Class Not Applicable To Licence
4 x R12(7)(e)	Disposal Of Special Category Avian Fauna Without Authority
1 x R12(7)(F)	Disposal Of Avian Fauna To A Person Not Licensed To Keep Such Fauna
1 x R12A(7)(e)	Illegal Sale Of Protected Fauna Held Under Wildlife Licence
1 x R13(3)	Illegal Possession Or Control Of Avian Fauna Not Applicable To Licence Category
2 x R13(4)(a)	Failure By Licensed Bird Dealer To Keep Records
1 x R13(5)	Failing To Submit Bird Dealer Returns Within The Specified Period
1 x R13(7)	Sale Of Avian Fauna By Bird Dealer To A Person Not Licensed To Hold Such Fauna

WILDLIFE CONSERVATION REGULATIONS

NO. OF OFFENCES X SECTION OF ACT	OFFENCE
5 x R21(5)(b)	Failure To Carry Licence Whenever Taking Or Intending To Take Game (Ducks)
2 x R28(1)	Keeping Fauna In Captivity Without A Licence
2 x R30(1)	Keeping Of Avian Fauna In Cages Of A Size Less Than The Minimum Prescribed Dimensions
1 x R30(2)	Failure To Provide Adequate Perching Facilities For Avian Fauna
2 x R30(3)(a)	Failure To Provide Adequate Food Water Containers For Avian Fauna Held, Or To Maintain Such Containers In A Clean Condition And Keep Them Filled
1 x R30(3)(b)	Failure To Keep Cages In Which Avian Fauna Is Held, In A Clean And Well Ventilated Condition
3 x R44(1)	Dumping Rubbish On A Nature Reserve
2 x R46(b)	Taking Of Flora From A Nature Reserve
1 x R46(e)	Unlawfully Interfere With The Water Level In A Lake Or Water Course On A Nature Reserve
1 x R46(g)	Operate A Vehicle On A Nature Reserve, Other Than On A Track Provided For That Purpose
6 x R46(j)	Carrying A Firearm On A Nature Reserve
1 x R46(l)	Cut Or Construct A Drain On A Nature Reserve
1 x R49(5)(i)	Unauthorised Lighting Of A Fire On A Game Reserve, Other Than A Gas Stove Or Similar Appliance
1 x R49(5)(c)	Shooting At Birds On The Water Whilst On A Game Reserve
2 x R52	Offering For Sale Immature Avian Fauna, Not Fledged Or Able To Feed Unaided
1 x R54(9)(a)	Using Animals, Namely Kangaroo Dogs In The Taking Of Fauna
1 x R54(8)	Using A Mist Net To Take Fauna Without Authority Of A Licence Specifically Endorsed for Such Purpose